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WILD RESOURCE CONSERVATION FUND
P.O. Box 1467 Harrisburg, PA 17120

JUN 18

DO SOMETHING *WILD* KEYSTONE WILD NOTES

A cooperative program of the PA Game Commission, PA Fish Commission and PA Department of Environmental Resources

Volume 1 Number 1 Summer 1985

Photo credit: PA Game Commission
Peter S. Duncan, Executive Director, PA Game Commission is providing some shade from the 90 degree heat to the baby river otter being held by Nicholas DeBenedictis, Secretary, Department of Environmental Resources, while Ralph W. Abele, Executive Director, PA Fish Commission, Chairman, Wild Resource Conservation Fund looks on. The River otter is listed as a vulnerable species in the recent publication of **SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA.**

SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA — A BLUEPRINT FOR ACTION PUBLISHED BY CARNEGIE MUSEUM OF NATURAL HISTORY

The Wild Resource Conservation Fund in conjunction with Carnegie Museum of Natural History, Carnegie Institute of Pittsburgh held a press conference in Harrisburg. The press conference was attended by 4 special guests, 2 river otter pups, a screech owl and a barn owl, all are species of special concern in Pennsylvania.

Dr. Robert M. West, Director, of the Carnegie Museum of Natural History presented copies of **SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA** to the three (3) environmental agencies administrators. Special bound copies of "SPECIES OF SPECIAL CONCERN" have been made for Ralph W. Abele, Executive Director, Pennsylvania Fish Commission, Peter S. Duncan, Executive Director, Pennsylvania Game Commission and Nicholas DeBenedictis, Secretary, Department of Environmental Resources. These are for their professional libraries.

"SPECIES OF SPECIAL CONCERN" is one of the first programs to be funded by monies generated by the Pennsylvania Wild Resource Conservation Act. This Act, signed into law June 23, 1982 by Governor Dick Thornburgh, enables the citizens of the Commonwealth to support the management and protection of non-game wildlife and native wild plants. Citizens support is achieved by checking off their voluntary donation of part or all of the state income tax refund to be contributed to the Wild Resource Conservation Fund. The Wild Resource Conservation is a cooperative program between the PA Game Commission, PA Fish Commission and PA Department of Environmental Resources.

Pennsylvania's rare and endangered species are the subject of **SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA**, a Special Publication of Carnegie Museum of Natural History, Carnegie Institute. This 430-page volume is the result of efforts by the Pennsylvania Biological Survey (PBS) to target plants and animals in trouble in the Commonwealth.

The Pennsylvania Biological Survey—sponsored by the Mid-Atlantic region of the National Audubon Society, the Pennsylvania Game Commission, the Pennsylvania Fish Commission, and the Department of Environmental Resources—includes among its contributors a unique blend of professional biologists and amateur naturalists. Phase 1 of the Pennsylvania Biological Survey—the identification of threatened species, published in **SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA. SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA** describes 297 species of plants, insects, birds, fish, amphibians and reptiles, and mammals, giving their habitat requirements, their geographic occurrence, the documented threats of their existence, and recommended measures to combat these threats.

The editors of SPECIES, Hugh H. Genoways, curator of the Section of Mammals, at Carnegie Museum of Natural History, and Fred J. Brenner,

STATE LIBRARY OF PENNSYLVANIA

associate professor of biology at Grove City College (Grove City, PA), point to the purpose of this book in their "Editors' Forward." "It will serve," they state, "as a blueprint for action in saving the most endangered and threatened portion of our flora and fauna."

Ralph Abele, Executive Director, PA Fish Commission and also Chairman of the Wild Resource Conservation Board, stated "that with the critical habitat shortages on the horizon the species that are listed as vulnerable today will be threatened and endangered species of tomorrow. Unless concerned citizens become more involved and take a greater interest in the protection and management of critical habitat many species do not have a bright future."

Frank H. Felbaum, Executive Director, Wild Resource Conservation Fund, stated "That just because income tax season is over doesn't mean you for get the Fund. He would like to remind everyone that you can make direct contributions to the Fund all year long by sending your check to the: Wild Resource Conservation Fund, Comptroller's Office, Box 2063, Harrisburg, Pa 17120. Protecting and managing wild native plants and non-game wildlife is a 365 day a year obligation, not just during tax season. It's by all the contributions we receive that the Fund was able to print "SPECIES OF SPECIAL CONCERN".

SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA sells for $30.00 and can be purchased in Carnegie Institute's Nature Shop, or by sending a check for $30.00 plus $3.00 for postage and handling to: Publications Secretary, Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, PA 15213. Review copies are available on a limited basis. The Wild Resource Conservation Fund would like to give a special thanks to: Dale Snyder, Supervisor of Animal Services and Elaine Gruin, Naturalist at Zoo America, Hershey Park for furnishing the Screech & Barn Owls, and Ms. Diane Sevin, Bayou Otter Farm from Theriot, Louisiana, for the Otter pups.

Funded Projects

Fiscal Year 1984-85

Pennsylvania's Wild Resource Conservation Board approved $282,600 worth of projects. This money was the 1984 contributions collected from 1983 tax refunds that was donated to the Wild Resource Conservation Fund. These sixteen (16) projects funded are to protect and conserve the Commonwealth's non-game animals and wild plant species. The approved projects include:

* $45,375 to fund DER's Wild Plant Management Program. The Department is establishiing a classification system designed to help protect special plant populations. A centralized computer data base containing information on all of Pennsylvania's plants and wildlife will be maintained by the Department. This is statutory mandated under the Act 170-82.
* $20,000 in mini-grants for wild plant habitat propagation projects.
* $1,961 for Inventory of Wild Plants on Presque Isle. This will up-date 1908 survey.
* $12,000 — Updating the Pennsylvania Fish & Wildlife database. The first species to be updated are those which are listed as either endangered or threatened.
* $29,500 — Update 1950 publication, "Pennsylvania Reptiles & Amphibians". This publication will be used as an educational tool which will be used in the classroom.
* $9,136 — Assessment and management of wildlife depredation at fish hatcheries.
* $8,068 — Extraction of useful data from organized snake hunts; rattlesnake populations and how individual snakes respond to the hunt and handling.
* $22,862 — The study intends to focus on the drainages in the Ohio River system (located in Pennsylvania) where 21 of the 29 undetermined status species are found in this watershed.
* $35,000 — Pennsylvania Breeding Bird Atlas Survey; the data gathered will provide a sound foundation for environmental planning at all levels of government. This study locates the breeding habitats of birds across the Commonwealth.

* $40,000 — Western Pennsylvania Conservancy to continue its database and field survey work on Pennsylvania Natural Diversity Inventory.
* $35,000 — Non-game wildlife coordinator, this individual will be responsible for all activities dealing with non-game wildlife programs.
* $9,000 — This survey will help monitor 32 species for use in up-dating the computerized inventory system for mammal research and management.
* $45,000 — The Nature Conservancy to continue its database and field survey work on Pennsylvania Natural Diversity Inventory.
* $10,000 — Pennsylvania River Otter reintroduction program.
* $3,796. — This study would investigate the legal status of small non-game mammals in all fifty states and Canada. It will be reviewing all pending laws and regulations that govern mammal protection.

- $2,000 — Field survey of Pennsylvania Natural Diversity Inventory in the Pymatuning Region. The Wild Resource Conservation Fund was established in 1982 by the State Legislature. This fund is to help finance non-game wildlife and wild plant programs carried out by the Pennsylvania Fish Commission, Pennsylvania Game Commission and Department of Environmental Resources. Pennsylvania State Income Tax Return provides a space where taxpayers may donate to the Fund all or a portion of their tax refund. Those who wish to contribute, but get no tax refund, may write a check payable to the Wild Resource Conservation Fund and mail it to: Comptroller's Office, Box 2063 Harrisburg, PA 17120

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Frank H. Felbaum

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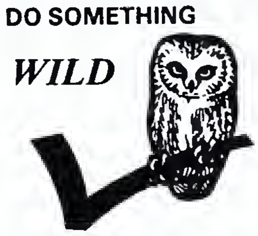
Keystone Wild Notes

SURVEY RESPONSE

Do you recognize this symbol?



This question was asked on a recent survey conducted by the Pennsylvania Wildlife Federation. To everyone's surprise 65% of the people responding to the survey DID NOT recognize this symbol. How about spreading the word, tell a friend about Wild Resource Conservation Fund. The W.R.C.F. receives Direct Contributions all year long.

Photo Credit: PA Game Commission

Two 8 week old otter pups out enjoying the sunshine.

Update: River Otter

Reintroduction

The river otter **(Lutra canadensis)** was historically found in every major water system in Pennsylvania. Water pollution, deforestation, and unregulated trapping eliminated it in all but the Pocono Mountains of northeastern Pennsylvania. Improved water quality throughout the state leads us to believe that certain areas which once supported otters could, with proper management, do so again. In 1983, a program was initiated to reintroduce river otter into Pine Creek drainage in northcentral Pennsylvania. From May 1983 through July 1984, 22 otters were released along this stream. These otter were obtained from northeastern Pennsylvania, Louisiana, Michigan, and New York. Success of initial releases was determined by radio tracking and locating field sign. Radio tracking data indicate otter can survive well at the relocation site. Louisiana otter adapt to northcentral Pennsylvania's harsh winter weather. Instrumented otter are known to have travelled up to 80 km from the release site, but they have more typically remained within the "general" relocation area. An analysis of otter scats collected in the study areas indicates fish and crayfish are the most commonly occurring food items in their diet. Otter have established several frequently used den sites, including undercut banks, rock formations, backwater sloughs, and flood debris.

Populations suffered serious declines during the 1800's and early 1900's due to pollution from the addition of toxic substances to inhabited waterways. Many extensive tracts of formerly suitable otter habitat were polluted by tanneries, mines, oil wells,chemical works, factories, and foundries. (Rhoads 1903) In 1952, the Pennsylvania Game Commission gave otters complete protection. This protection proved extremely valuable in saving the species from extermination.

Eveland (1978) evaluated the state's otter population and distribution by means of a questionnaire distributed to county game protectors throughout the state. His estimates showed that otter numbers ranged from 285 to 465, averaging 175. Over 90% of the population was found to reside in seven counties of the northeast, with the remainder representing occasional scattered sightings from four other counties. Almost 70% of the population in a seven-county concentration was found in three counties, Pike, Wayne, and Monroe. This northeastern population is bounded by development and metropolitan areas,which largely block westward extension into the Susquehanna River drainage.

Recent improvements in water quality and management techniques have provided renewed potential for otters to regain portions of their former range. In 1983, this project began efforts to determine whether a breeding population of reintroduced otter could be established within the Pine Creek in northcentral Pennsylvania.

A total of 22 otter from Louisiana (17), northeastern Pennsylvania (3), New York (3), and Michigan (1) were released within Pine Creek drainage from May 1983 through July 1984. Data obtained through radio tracking and scat analysis indicates otter successfully fed, located den sites, and remained in the drainage. Louisiana otter adapted well to northcentral Pennsylvania's cold winter weather. Heavy canoeing and fishing pressure appeared to have little consequence on the otters' movement. Otter (F16) was believed to have reared young at one of the most popular fishing holes on Pine Creek.

Dispersal of released otter appeared related to the presence of previously released otter. The first pair of radioed otter released along Pine Creek established a long range including the release site. Otter released later at this site tended to travel greater distances and usually did not include the release site in their range.

Mortality occurred in two of the radioed otter. Environmental factors relating to severe flooding and ice flow (2/13/84) was repsonsible for one mortality. The other mortality was probably caused by the otter's inability to properly feed due to teeth damage which occurred when it was trapped in Louisiana. The interactions observed during radio tracking suggest otter will have little difficulty locating one another for breeding. Erickson et al. (1984) has also drawn such conclusions in his study of a similar reintroduced population in Missouri.

This investigation has demonstrated that otters from various states and those live-trapped within the state, given proper management, can adapt well to selected watersheds presently outside their natural range. Given adequate protection and further study such translocated animals may form the nucleus of new and diverse sub-populations throughout the state.

Pennsylvania Breeding Bird Atlas Project

by

Dan Brauning

Hundreds of birders across Pennsylvania are now taking to the field to participate in the Pennsylvania Breeding Bird Atlas Project. The largest such research project ever attempted in the state, its goal is to identify and map the distribution of all bird species presently breeding in Pennsylvania. Field work is being carried out by an army of volunteers under the supervision of forty Regional Coordinators, all of whom are experts in their areas. The Project is under the direction of Dr. Frank B. Gill, Curator of Ornithology at the Academy of Natural Sciences of Philadelphia; Daniel Brauning, the Project Coordinator, is also on the staff of the Academy.

The Breeding Bird Atlas Project began on a trial basis in 1983, at which time volunteers from 15 of Pennsylvania's 67 counties began their search for breeding birds. Although limited in scope, this initial effort was a great success, demonstrating that the state was ready to participate in a full-scale Atlas Project. In 1984, the Project was officially launched with the support of the Wild Resource Conservation Fund. By the end of the year, Atlas volunteers had collected data from over 900 blocks in a total of 50 counties, achieving 20 percent coverage of the state in the first of the Project's five years.

Atlas volunteers have made some exciting discoveries during their first two years of field work. One of the most significant was the 1983 observation of a nesting Dickcissel on a reclaimed strip mine in Clarion County; this was the first reported nesting for this species in Pennsylvania in 40 years! Reclaimed strip mines seem to be an inviting habitat for many uncommon grassland species, and in 1984 Atlas volunteers found Upland Plovers as well as Grasshopper, Vesper, and Henslow's Sparrows nesting on these areas in western Pennsylvania. This is an encouraging discovery, demonstrating the value of careful land management practices and the resourcefulness of colonizing species.

In addition to finding hitherto rare or unknown species in Pennsylvania, Atlasers have also discovered instances of range expansion among more common species. Hooded Mergansers, which has previously been reported nesting only in Crawford County, were recently discovered nesting in neighboring Warren County as well as in Washington County, in southwestern Pennsylvania. Similarly, during the first year of Atlasing, Common Mergansers were documented nesting in all of the state's major northern watersheds. The Clay-colored Sparrow also appears to be undergoing an expansion into Pennsylvania; it had not been reported to nest in here in the past, but last year males were found singing in two separate locations in the western part of the state.

The Pennsylvania Breeding Bird Atlas Project is an ambitious undertaking, and it should be instrumental in providing more thorough base-line data about the state's birds than has ever been available before. Each year brings an increase in the number of participants, and now there is a Coordinator for each of the 40 Regions of the state. With this organization and involvement, the Project Directors are confident that they will be able to make great progress towards the goal of documenting nesting birds all over Pennsylvania.

The 1985 season promises to be an exciting one. Volunteers are still needed, though, and all birders interested in contributing their efforts are urged to write or call the Project Coordinator, Daniel Brauning, at:

The Academy of Natural Sciences
of Philadelphia
Nineteenth and The Parkway
Philadelphia, PA 19103
(215) 299-1181

Photo Credit: Paul Wiegman
Western Pennsylvania Conservancy

Arethusa bulbosa
Swamp Pink (Proposed Threatened)

Pennsylvania Native Wild Plant Conservation

by Kathy McKenna

69 plant species which occur naturally within lands and waters of Pennsylvania have been proposed as being either endangered or threatened of loss from their ecological range in the Commonwealth. Populations of these remaining species must be preserved to retain the natural diversity of Pennsylvania.

Conservation of plant species that have declined to the extent of "special concern" requires extensive inventory, management, and regulatory protection. Efforts to establish and conduct this type of conservation procedure are outlined in the provisions of the Wild Resource conservation Act of 1982 and are supported by funding allocated by the Wild Resource Conservation Board.

The native wild plant management program is centrally located in the Department of Environmental Resources, (DER) Bureau of Forestry. Monies granted from the Wild Resource Conservation Fund, (WRCF) enabled the DER to hire a botanist to coordinate activities associated with PA native wild plants of special concern. The fund also supports assistance from the Western PA Conservancy and the Eastern PA chapter of the Nature Conservancy to carry out most phases of native wild plant management. The Morris Arboretum of the University of Pennsylvania has also provided assistance to DER by conducting field investigations which are fundamental in determination of the present status of special concern plant species populations.

The management of native wild plants begins with the collection of historical information to describe plant populations, their habitats, geographic locations, and other biological and ecological data. Once this task has been accomplished, the next phase involves searching for these documented plant locations and updating information to describe the current status of both the plant species and their habitats. These field surveys supply the necessary information to determine the degree of decline of the 405 plant species of special concern. The 1985-86 funding by the Wild Resource Conservation Board to conduct field investigations of this nature have been allocated to four organizations who will update historical records and search for additional plant locations throughout Pennsylvania. The Western PA Conservancy will receive $40,000.00 to assist with the plant program and to survey 31 western counties, and the Nature Conservancy will receive $45,000.00 for plant management assistance and to conduct field surveys in 36 eastern counties. In addition, The University of Pittsburgh, Pymatuning Lab. of Ecology will receive $2,000.00 to investigate specific locations in the northwest, glaciated section, and the Presque Isle Audubon Society will receive $1,962.00 to record data necessary to update early botanical studies on Presque Isle. All of this information will be stored within the Pennsylvania Natural Diversity Inventory, (PNDI) a computer indexed data based maintained by the Bureau of Forestry. These studies are vital to the wild plant management program since the inventory has yet to survey approximately 70% of the total 2385 records of plant population occurences documented prior to the 1985 field season. The Wild Resource Conservation Fund will also be utilized to support approximately 40 $500.00 wild plant mini-grants which focus on wild plant propagation, symposiums, publicity, and protection through various means.

The Wild Resource conservation Act required the Environmental Quality Board to issue regulations necessary to manage and protect native wild plants. these regulations entered proposed rule-making in February, 1985. Upon finalization in the near future, Pennsylvania will finally have an official list of plant species classified into eleven categories which describe their degree of jeopardy in the Commonwealth. The regulations provide for a wild plant management permit procedure, and set up a commercial licensing system for those persons who buy, trade, or barter PA "vulnerable" plants with the intent to sell or export them from the state. The regulations also establish criteria to develop a statewide system of private plant sanctuaries.

Prior to passing of the Wild Resource Conservation Act, Pennsylvania had no management or protection for native wild plants. Following its legislative approval, however, the Wild Resource Conservation Act has enacted one of the strongest programs in the Eastern United States in conserving native wild plant species otherwise faced with potential elimination from their natural range in our Commonwealth.

For any further information on native wild plants, contact Ms. Kathy McKenna at (717) 787-3444, in the Harrisburg Office of the Bureau of Forestry.

Photo Credits: B. D. Sills/Hersheypark

Troy Stump, (right) Director of Zoo America introduces the $1,000.00 scholarship recipients, Pat McGarth and Bill Lewis to Frank Felbaum, Executive Director, Wild Resource Conservation Fund and Dr. Donald Bruning Curator of Ornithology, Bronx Zoo, members of the reviewing panel. Mike Ondik the other member of the panel is not pictured.

CONSERVATION SCHOLARSHIP AWARDS

ZooAmerica at Hersheypark, Hershey, PA awarded $4,000.00 in scholarship money to six college bound high school seniors. Scholarships were awarded after students sent both an applicaiton and an essay on a subject relating to zoology or biology to ZooAmerica.

Executive Director, Frank Felbaum of the Wild Resource Conservation Fund was ask to be a member of the independent panel to review the essays. Other members of the review committee were Donald Bruning, Ph. D., Curator of Ornithology, Bronx Zoo and Mike Ondik, Safety and Education Director for the Pennsylvania Forestry Association and Chairman of Pennsylvania Wildlife Federation.

Two $1,000.00 scholarships were presented to William E. Lewis, Jr. of Kutztown Area High School, Kutztown, PA and Patrick M. McGarth of Cardinal O'Hara High School, Media, PA. Receiving $500.00 scholarships were Kimberly A. Jacobs of Northeastern Senior High School, Dover, PA; Joseph S. Palumbo of Bishop Hafey High School, Hazelton, PA: Kevin M. Simmons of Central High School, Philadelphia, PA: and Eric J. Weissberger of Washington High School, Philadelphia, PA.

New Publication

Endangered and Threatened Species of Pennsylvania, a joint publication of the Pennsylvania Fish and Game Commissions, printed with funds made available through the Wild Resources Conservation Fund will be made available to the general public on July 1,1985.

Designed as an awareness booklet to acquaint the reader with 29 birds, animals, fish, reptiles and amphibians that are either endangered or threatened in Pennsylvania, it can also be used by high school teachers and students in science, environmental, or outdoor education classes.

Each page contains a colored photograph or drawing of the subject, identifying characteristics, biology-natural history information, preferred habitat, reasons for being either endangered or threatened, and management practices currently being used to protect it. In addition, a small range map is included.

Color-keyed for easy reference, the book is available for a small mailing fee from the Fish and Game Commission offices in Harrisburg or from the Wild Resources Conservation Fund headquarters in Harrisburg.

Addresses are as follows:

Pennsylvania Game Commission Office of Information
P.O. Box 1567
Harrisburg, PA 17105-1567

Wild Resources Conservation Fund
Room A-1-85
Evangelical Press Building
3rd and Reily Streets
Harrisburg, PA 17120

Pennsylvania Fish Commission
Office of Information
P. O. Box 1673
Harrisburg, PA 17105-1673

ELK MOVEMENT STUDY

The Wild Resource Conservation Board at its 1983 annual meeting allocated $10,000 for the continuance of the radio-telemetry work on the Commonwealth's Elk herd. This grant partially supported the study since it was a three year program from January 1, 1982 to December 31, 1984. The period funded by the Wild Resource Conservation Fund was from approximately January 1984 to September 1984.

This is an abstract from the final report and recommendations after the Elk Research Project had been completed. Full reports can be obtained from the Pennsylvania Game Commission, Box 1567, Harrisburg, PA 17120. A reproduction and mailing fee will be charged to individuals ordering these documents due to their length.

Movements of 21 radio-collared elk in Pennsylvania's elk range were followed during 1982, 1983, and 1984 to determine where elk originate and return to, following their use of agricultural areas.

Bulls were more likely to visit farmland than were cows. Eleven of the 21 radio-collared elk were bulls. However, 6 of 7 marked elk that were located in farmland were bulls. Bulls made more significant movements than cows (30 and 16 respectively) and traveled greater average distances during these movements (5.3 and 2.1 miles respectively).

WILD RESOURCE CONSERVATION FUND

P.O. BOX 1467 • Harrisburg, PA 17120 • 717-783-1639

Please accept my additional contribution to the Wild Resource Conservation Fund of

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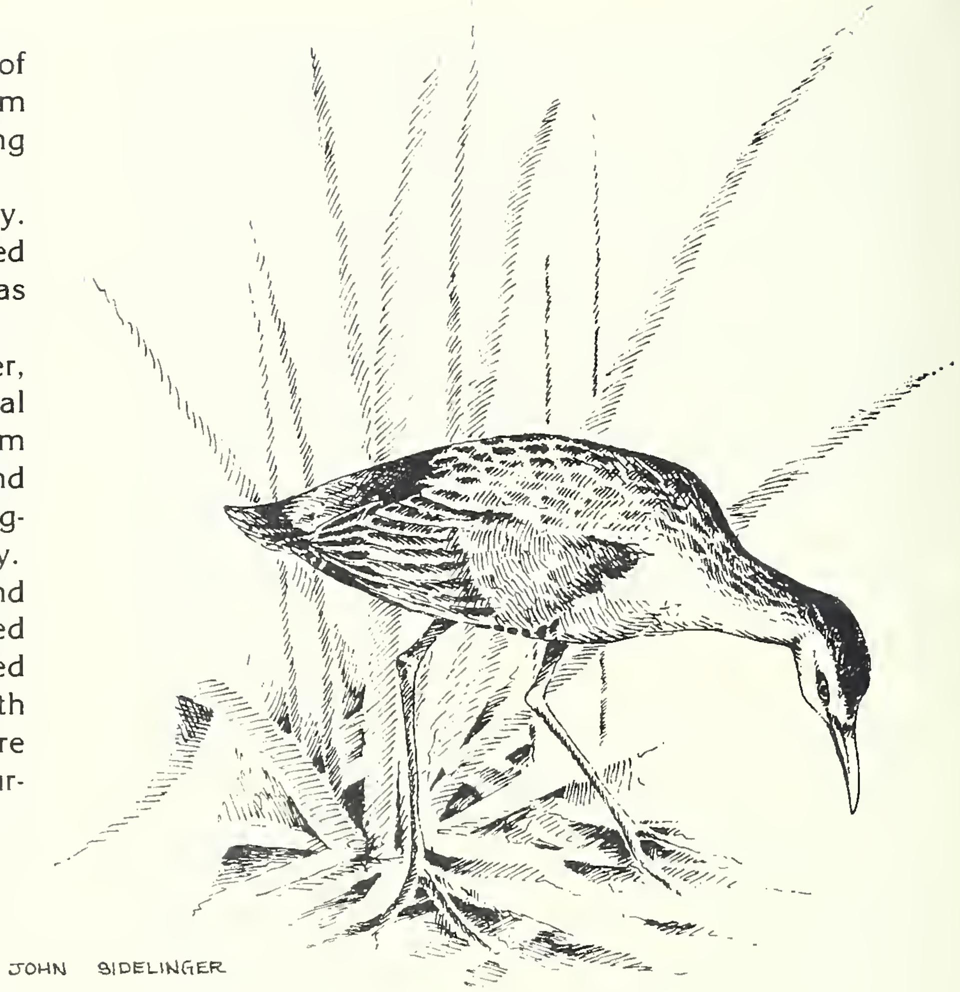
Mail contribution to: Wild Resource Conservation Fund, Comptroller
Box 2063, Harrisburg, PA 17120

There was no apparent pattern to the timing of movements to agricultural areas but movements from these areas were often made by bulls during breeding season.

Movement to farmland often resulted in mortality. There was 57% mortality to marked elk that frequented agricultural areas. Overall mortality to marked elk was 29% during the study.

Use of the Winslow Hill area, at one time or another, by 6 of the 7 marked elk that frequented agricultural areas indicated its importance as a dispersal area from and to farmland. Movement of 4 bulls from farmland to Winslow Hill during the breeding season also suggests that it may be an important breeding territory.

Marked elk used reclaimed strip mine areas and clearcuts heavily during the study. Use of wooded habitat was less than expected. Most use of reclaimed strip mine habitat was during the summer and fall with very little occurring during the winter. Clearcuts were heavily used during the winter with very limited use during the summer and fall.



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DO SOMETHING *WILD*
KEYSTONE WILD NOTES

Volume II Number 1 **FALL 1985**

*A cooperative program of the PA Game Commission, PA Fish Commission, PA Department of Environmental Resources and Direct Contributors to the Wild Resource Conservation Fund

PA GAME COMMISSION

HASSINGER—NONGAME BIOLOGIST

Photo Credit: Pennsylvania Game Commission

As of July 1, 1985 Jerry D. Hassinger was employed as Non-Game and Endangered species Biologist for the Pennsylvania Game Commission. His responsibilities will be to conduct formal inventories and field surveys for habitat compatible to the species under his charge. Also he will be developing a comprehensive plan for the management of non-game within the Commonwealth.

Jerry received his Bachelor of Science Degree in Wildlife Technology from the University of Montana. He received his M.S. in Zoology from Pennsylvania State University, other post graduate colleges include courses at the University of California, Davis and at the Iowa State University.

Hassinger has a broad background of experience to add to his long list of credentials. He was employed for the position of seasonal ranger as a Plant Disease Control Specialist in four National Parks, the Everglades, Mt. McKinley, Glacier and Yellowstone. He worked for the Iran Game and Fish Department for two years identifying special areas for the establishment of wildlife preserves. Prior to his employment in Iran he was the Senior Expedition Fellow for the Field Museum of Natural History in Chicago and coordinated a mammal collecting expedition to Afghanistan. As a result of this expedition he authored a book titled the "Mammals of Afghanistan". For ten years he was employed as a Forest Wildlife Specialist with the PA Department of Environmental Resources, Bureau of Forestry. In 1980 he began his career with the Pennsylvania Game commission as a wildlife biologist.

Hassinger is currently active and maintains memberships in many job related conservation groups; The Wildlife Society, American Society of Mammalogists, The National Wildlife Federation, Pennsylvania Forestry Association, Pennsylvania Deer Association, Audubon Society and Pennsylvania Outdoor Writers Association. He currently is giving slide lectures titled "Nobody Cries When Habitat Dies", "The Management and Future of Elk in Pennsylvania" and "Dead Wood is Good for Wildlife".

Hassinger resides in Millersburg, PA, with his wife Diane and his two daughters.

The Snow Trillium, *Trillium Nivale,* in Pennsylvania

by Bethany Woodworth, PNDI-W

One of the first showy wild flowers of spring is the snow trillium (Trillium nivale Riddell). So eager is this tiny trillium to welcome spring that it often blooms in March or early April while a blanket of snow still whitens the western Pennsylvania woodlands.

The snow trillium's diminutive size and delicate flower make it a favorite of botanists willing to brave the brisk March weather. Only 1.2 to 6 inches high, it is one of the smallest of about 51 species of Trilliums in North America and Asia. The flowers, with three white petals and three lighter green sepals, are held above three dark green leaves on a hexagonal stem.

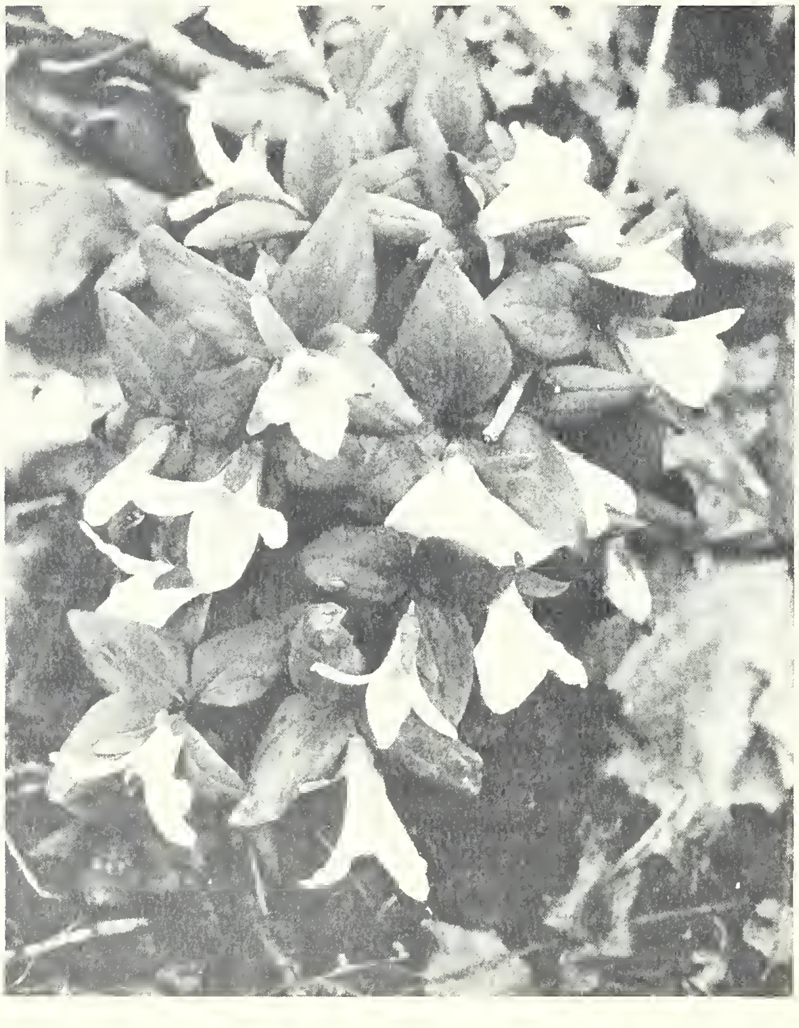


Photo Credit: Paul Wiegman / Western Pennsylvania Conservancy

By mid- to late April snow trillium's flowers have been pollinated, and the faded blossoms droop below the leaves almost touching the ground. The fruits mature in three months, and the seeds, which are brown to reddish brown, are released. Attached to one side of the seed is a mound of smooth firm white tissue called the elaiosome.

The seeds of snow trillium are believed to be dispersed by ants. Searching the forest floor for food, ants are attracted by the fleshy appendage, and carry the seeds back to their underground nest. They remove the elaiosome, then carry the seeds out of the nest and dispose of them on the forest floor. The seed itself is unharmed, and if conditions are right for germination, will begin to grow. In this way young plants are spread out from parent plants and new areas are colonized.

The snow trillium ranges from western Pennsylvania and Maryland to the extreme eastern portions of South Dakota and Nebraska; from southern Michigan, Minnesota and Wisconsin south to central Missouri and Kentucky.

Within its range, the snow trillium is rare and local in the east, becoming more abundant westward. It is considered rare in many of the states on the periphery of its range, including Pennsylvania, Maryland, South Dakota, West Virginia and Virginia. It is listed as potentially threatened in Ohio, threatened in Michigan, and endangered in Kentucky.

The snow trillium is usually found on the steep, forested banks of stream and river valleys or in protected ravines. These slopes are usually north-facing, although there are exceptions. The species is a calciphile, limited almost exclusively to soils underlain by limestone or dolomite, and is often found on limestone ledges and outcrops. The soil is rich and moist, and the canopy is open during spring, before the leaves expand.

Sugar maple is an important component of the forest at snow trillium sites. Basswood is often present at sites as well. Other trees commonly found include American beech, red and white oak, white ash, and red maple. Hemlocks can sometimes be found nearby. The shrub layer is usually minimal to moderate, containing saplings of the larger tree species in addition to common witch hazel and wild hydrangea. Other wildflowers and plants to look for are round- and sharp-lobed hepaticas, spring beauty, bedstraw sp., wild stonecrop, Christmas fern and spinulosa wood fern.

There are twenty-one known naturally occurring populations of *Trillium nivale* in Pennsylvania. The populations are clustered in the southwestern corner of the state in four counties: nine in Allegheny, five in Westmoreland, and three each in Beaver and Washington counties. Eleven other populations have been reported from these counties, but field surveys have failed to locate them.

Thirteen sites remain to be field checked, including one from Cambria county, which would extend snow trillium's range to the east, and one from Fayette county. There is a small introduced population in Butler county, about thirty-five miles out of the snow trillium's natural range, and several other introduced populations in Beaver and Allegheny counties.

Populations vary in size, but most often there are about three to five hundred individual plants scattered thinly over a site. There are a few sites, however, where the trillium can be seen growing together in clumps of a few to as many as 40 plants.

By far the finest stand of the snow trillium in Pennsylvania is in western Westmoreland county, Possum (commonly called "Guffy") Hollow. The plants cover several acres and number from 16,000 to 24,000. The hollow is a favorite spot for botanists, birders and naturalists in the area.

Trillium nivale may often be overlooked because of its early blooming season and because it grows in relatively out-of-the-way places. It is possible that there are other locations in the state which have not been reported.

Taking into consideration the number of known and potential sites, it is certain that the snow trillium, ***Trillium nivale,*** is not in critical danger in Pennsylvania. It is still of concern, however, for although not critically endangered neither is it common, and most of the populations in the state have been degraded to varying extents or are potentially threatened.

Some of the most common threats are trail bikes and off-road vehicles, logging, trampling by livestock and humans, and various disturbances upslope from sites; also excessive removal of individuals from sites for transplantation by hobby collectors. Some degree of protection is inherent in the species' choice of habitat—the steep banks and rock bluffs rarely lend themselves to development very easily—but the areas are still open to logging and the sites with more gentle topography remain vulnerable.

If you know of populations of snow trillium, the information would be welcome. Please contact: Pennsylvania Natural Diversity Inventory/The Western Pennsylvania Conservancy / 316 Fourth Ave. /Pittsburgh, PA 15222.

PROJECT STATUS REPORT

EXTRACTION OF USEFUL DATA FROM ORGANIZED SNAKE HUNTS

by Howard K. Reinert, Ph.D.

Letters of introduction describing the proposed research project and requesting cooperation in data collection were sent to all organizations that sponsored snake hunts during 1985. Positive responses were received from the Morris Fire Company, the Sinnamahoning Sportsmen's Association, and the North Central Pennsylvania Reptile Association. No responses were received from the Keystone Reptile Club, the Clarion River Reptile Association, and the Pond Bank Improvement Association.

To date, three snake hunts have been attended by the investigator. These hunts were held at Morris, Sinnamahoning, and Lock Haven and were sponsored by the Morris Fire Company, the Sinnamahoning Sportsmen's Association, and the North Central Pennsylvania Reptile Association, respectively. Table 1 indicates the number of timber rattlesnakes ***(Crotalus horridus)*** examined at each of these hunts.

Table 1. Timber rattlesnakes ***(Crotalus horridus)*** examined at snake hunts.

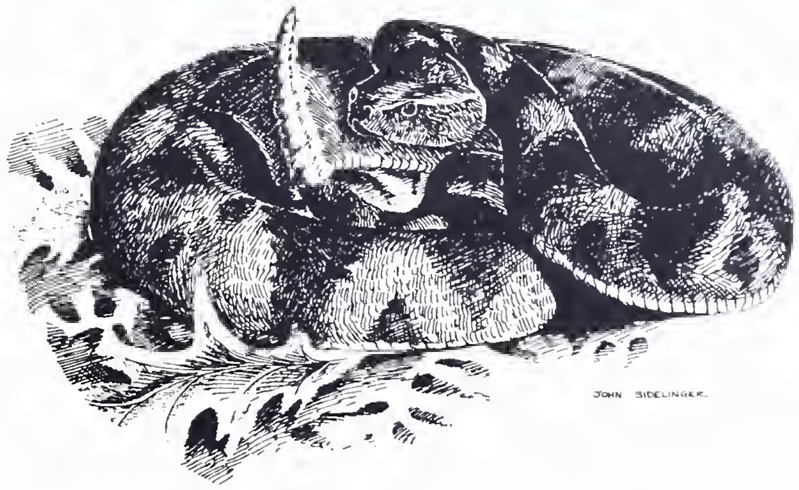
	NUMBER OF SNAKES EXAMINED		
SNAKE HUNT LOCATION	MALES	FEMALES	TOTALS
Morris, Tioga Co.	12	0	12
Sinnamahoning, Cameron Co.	10	3	13
Lock Haven, Clinton Co.	10	4	14
Totals:	32	7	39

Each examined snake was marked with a spaghetti-type anchor tag attached to the rattle. These tags contained an individual identification number, the words "PA. FISH COMMISSION", and the telephone number of the Herpetology and Endangered Species Coordinator. In addition, information concerning the size, sex, reproductive condition, moulting condition, and general health was recorded for each snake.

All snake hunters capturing rattlesnakes were requested to complete two questionnaires. The first of these questionnaires is designed to provide the investigator with information pertaining to the snake hunter, the second provides information concerning the location and method of capture.

The thirty-nine rattlesnakes examined to date were captured by twenty-five hunters from a total of twenty-four separate localities in Blair, Cambria, Cameron, Clearfield, Clinton, Elk, Lycoming, Potter, and Tioga Counties. Following examination and tagging, all snakes were turned over to hunt officials for use in the snake hunt program and subsequent release.

Snake hunt sponsors and most of the snake hunt participants have been very cooperative and, for the most part, have accepted this project as a positive step in research and management of the timber rattlesnake.



BREEDING BIRD ATLAS: A SUCCESSFUL SEASON

by Dan Brauning

The word is out! Atlasing is fun and educational. This year, nearly 1,000 volunteers surveyed birds in every county in Pennsylvania. Early reports indicate that this increased effort is producing excellent results and that the year has been a great success.

Atlasers searched new areas and made exciting discoveries during the 1985 season. Black Rail, Chuck-Will's-Widow and Clay-colored Sparrow, rarely reported in Pennsylvania, were all found this summer by Atlas volunteers. And, for the first time ever in North America, the European Jackdaw nested, although unsuccessfully, right here in Pa! Rareties such as King Rail, Yellow-bellied Flycatcher, and Saw-whet Owl nested successfully here as well.

This list is impressive, but it is only the beginning of the exciting reports we expect to see coming out of the Atlas Project. The full story will not be known until the data are analysed later this year, at which time we will summarize our progress to date. We have completed two years of field work, but much still remains to be done. The results achieved by other states encourage us in our belief that we will be successful. Vermont published and is distributing their Atlas this year, and New York completed their field work, with 99.7% of the state's blocks covered. Birders in Pennsylvania have taken up the challenge: they are are sharpening their skills, plunging enthusiastically into their field work, and savoring the fun that is Atlasing.

Attracting Backyard Birds

Americans spend over $54 million each year on backyard birdfeeding stations and more that $500 million on bird seed.

Now the Fish and Wildlife Service has a way for you to build your own winter feeding station for next to nothing.

In fact, the Interior Department's novel birdfeeding design can help make a big dent in your load of trash, as well as supply you with a quick and easy crafts idea for schoolchildren.

Where the price of many commercial bird feeders often start at $10, this design can be built for about a dollar, depending upon the household materials and simple tools you might already have at hand.

The sunflower feeder will draw chickadees, nuthatches, cardinals, and other winter residents, according to Fish and Wildlife biologists Alex Knight and Willard M. Spaulding, Jr., who created the design.

Directions for the feeder follow, illustrated with step-by-step instructions.

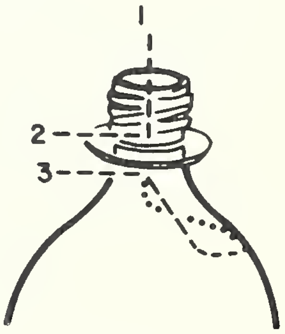
Materials needed:

Three 2-liter plastic soft-drink bottles, a 7-inch dessert topping lid, a baby food jar lid, a coping saw, a single-edged razor blade or "X-acto" knife, all-weather rubber sealant, 8 inches of wire or monofilament fishing line, a small nail or 7/16-inch bit and hand drill, a metal or wood screw

Soak a 2-liter bottle in warm, soapy water to clean inside and remove label. Pull off the colored plastic base, but save it for use as a measuring devise when cutting the feeding hole.

Step 1:

Using a second 2-liter bottle, make a perpendicular cut with the coping saw at the bottle's mouth down to the point at which the neck collar begins. Make a second cut at, and slightly above, the collar perpendicular to the first cut. Discard the cut piece. Cut the remaining seciton of the neck and collar away from the bottle, leaving at least a 1-inch flange of plastic beneath the collar. Using a third 2-liter bottle, repeat these same steps. The two spouts that result will be used as feeding holes, with their neck pieces preventing seed spill-out.

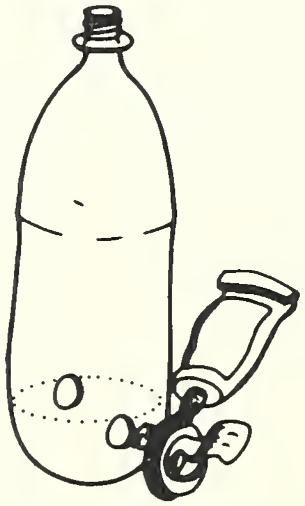


Step 2:

Cut two 1-inch circular holes across from each other in the sides of the first bottle. The top of the plastic base that was removed earlier will serve as a guide—the top of each cut should be made at the same point as the top of the plastic base.

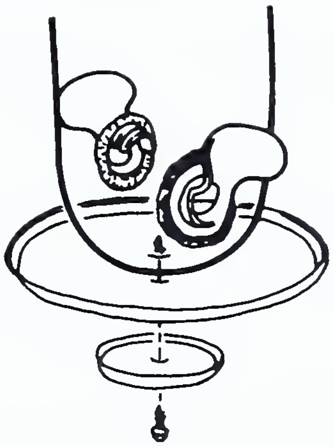
Step 3:

Apply sealant arount the outside of each feeding hole. Insert the spouts into the bottle, flange end outward. The collar on each spout and the sealant will form a watertight "gasket." Secure with a rubber band until dry.

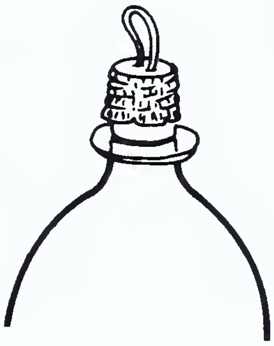


Step 4:

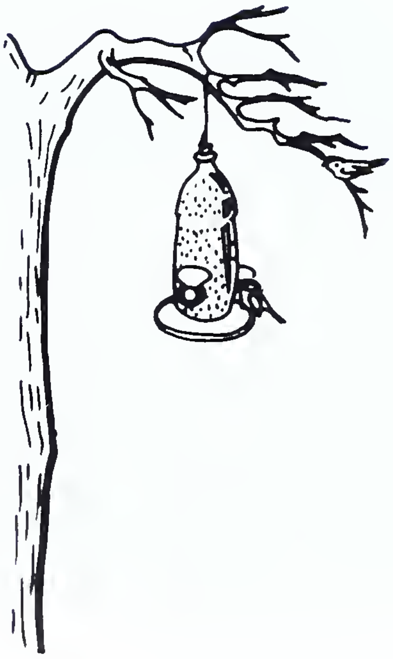
Using the drill or small nail, make small holes in the bottom of the bottle and the dessert topping and baby food lids. Attach the two lids, with the baby food lid on the bottom, to the bottom of the bottle with the metal or wood screw. The topping lid will form the perch that the baby food lid will stabilize.



Step 5:
Drill or punch two shall, parallel holes in the bottle top. String wire or monofilament line through the holes and tie. Once the bottle is filled with sunflowers seeds, screw the top onto the bottle.



Now that you've built your bird feeder, what should you feed backyard birds? In some cases, not the birdseed you commonly find at the grocery store. The Fish and Wildlife Services's report, "Relative Attractiveness of Different Foods at Wild Bird Feeders," will tell you what seed mixtures draw the most sought-after species where you live. For a copy send a check or money order for $2.75 to the Superintendent of Documents, U.S. Government Printing Office,Washington, D.C. 20402 (specify the report by title and by stock number 024-010-00587-4).



Purple Martin Restoration and Research Project

by Lysle S. Sherwin, Executive Director,
Loyalhanna Watershed Association

Dennis Jones, Pennsylvania Game Commission

Ligonier, PA—Swallows return to Capistrano and vultures to Hinckley, Ohio, but townspeople in Ligonier are wondering if the purple martins will come back to nest on the picturesque town square "Diamond" of their Westmoreland County community.

Purple martins, the largest member of the swallow family, which once nested here by the hundreds not too many years ago have declined to only one breeding pair by the spring of 1985. In a unique partnership of private and state wildlife conservation agencies, the Loyalhanna Watershed Assocation, Inc., and the Southwest Division, Pennsylvania Game commission initiated a "Purple Martin Research and Restoration Project" aimed at rebuilding the colony.

According to Lysle S. Sherwin, executive director of the Loyalhanna Watershed Association, the project actually got its start through an osprey nesting platform project in which the two organizations are involved. He explained, "Dennis Jones, Land Management Supervisor in the Game Commission's Ligonier office and I attended the Audubon Society of Western Pennsylvania's banquet to hear Dr. Larry Rymon, East Stroudsburg University, speak on the osprey reintroduction program. Like the Commonwealth's bald eagle restoration effort, fledgling ospreys are reared and liberated to the wild—a process called "hacking," to eventually return and nest in their natal area. The plight of Ligonier's purple martins came up in conversation and Rymon suggested the hacking technique as a possible solution."

The presence of wild adult birds to act as mentors for the fledglings was thought to be an important factor in a successful hacking attempt. Although there was great uncertainty about the prospects for any of the native Ligonier birds to return in 1985 since the population had apparently dropped so low the prior year, much had to be accomplished in a scant two or three weeks time before migrants were due back from their winter range in Brazil.

Application was made for the necessary U.S. Fish and Wildlife Service collection permits and advice sought on food, rearing methods and other aspects from biologists and ornithologists at the Patuxent Wildlife Research Center, Pittsburgh Aviary, and Powdermill Nature Reserve, the Ligonier Valley field research station of Carnegie Museum of Natural History. With no example to follow, wire-enclosed hacking boxes similar in appearance to traditional purple martin houses had to be designed from scratch and built at two locations - one near the lone active martin house on the town square and another at the Commission office where it was hoped a new colony could be established.

It was recognized that the project would be labor-intensive, involving daily dawn to dusk care and feeding of young birds for several weeks or more. The Watershed Association made a commitment to hire two shifts of temporary employees using proceeds from the annual Loyalhanna Wildlife Art Festival it sponsors in September to fund payroll costs. Five students from either St. Vincent College (Latrobe), West Virginia University, or Ligonier Valley Sr. High having majors or interests in wildlife management, biology, or veterniary science were employed for six weeks.

Perhaps the most important single element—a source of fledgling purple martins was eventually pinpointed with the help of Dale Sheffer, chief of wildlife research for the Commission. A rapidly expanding flock was located at the Shenango Reservoir wildlife management area in Mercer County. It was determined that the Shenango flock could provide up to 30 fledglings without adverse affects on a viable colony.

The arrival of one wild pair and an unmated straggler at the Ligonier colony in mid- May triggered the decision to go ahead with the hacking attempt. Through frequent contact with Shenango personnel on the status of egg laying, incubation and hatching, a collection date of June 18 was targeted in order to obtain birds at the optimum age of 7-10 days. Fledglings in this age class have had sufficient parental contact to be imprinted as purple martins but are believed to be not yet imprinted to a specific nest site and its surroundings.

An initial group of 13 fledglings was transported to Ligonier on June 18 and the second contingent of 15 was delivered nine days later. Mealworm grubs and maggots hand-fed in unlimited amounts were readily accepted, so much so that some birds became overweight and too heavy to fly. A change in diet to supplement the fat-rich insect ration with high protein mash and even raw hamburger soon brought the birds into flight condition.

From the outset, three wild martins in the vicinity interacted with the fledglings by frequently circling the hacking box, calling and landing nearby. The first "hacked" bird took flight on July 3 and immediately joined the wild flock to the great satisfaction of the project's organizers. A second left several days later and was also quickly accepted by the wild flock. For later identification birds were banded by Robert Mulvihill of the Powdermill bird banding station with standard metal bands and also plastic bands color-coded to mark them as Ligonier birds.

By the end of July, 25 birds had flown of which 16 are considered confirmed successful fledges and possibly as many as 23 have survived in the wild. Confirmations are based on band records of birds that returned to the hack box later for free meals or counts made of roosting birds.

Other steps are being taken to address some root causes for decline of Ligonier's colony. Tree limbs encroaching on the town's nest boxes and impeding the free flight space preferred by purple martins are being removed and new boxes erected on building roofs.

Although it won't be known until next spring if the fledged birds will return to nest, the first phase of the two-year project is a success and people in Ligonier are optimistic that, indeed, the purple martins will come back.

Pocono Deja Vu

by Tony Wilkson—PNDI-E

June 13 ...I observed nothing particular, but coming to the barrens, in the top, I soon found Cornus canadensis fl.—Rhodora canadensis grows here in great plenty & might easily have been taken for Azalea when out of flower; it nearly is done now flowering...

June 17 ...arriving late Tom and I hurried to set up light trap at favorite barren locale. Plans are to collect moths during the next several nights while mapping vegetation during the daytime hours. Moths look thick tonite...

Upon first glance one might construe these passages to be chronologic events in one's diary. And in a sense they are. Each refers to the extensive pitch pine-scrub oak barrens on the Pocono plateau near Long Pond. Frederick Pursh wrote his thoughts after arriving on foot in 1807, in 1985 we arrived via Subaru. Pursh first came to this spot during a botanical expedition that would take him from Philadelphia to the Catskills. We arrived from Harrisburg after a day of meetings, memos, and phone calls.

Photo credit: Tom Smith/The Nature Conservancy

The pine barren areas of the northeastern U.S. are remarkable ecological areas defined by their sandy soils and woodlands dominated by pitch pine and scrub oak trees with frequent openings dominated by ericaceous shrubs. The Pocono barrens appear unique in their abundance of Rhodora. From southern Maine to southern New Jersey these unique biological islands support a strikingly high number of rare plant and animal species. The Long Pond barren and associated wetlands are no exception, supporting both a rich flora and fauna. Several rare plants, including one species of sedge that is globally endangered, are found scattered throughout the barren. The water shrew is found in nearby associated wetlands and the sedge wren, northern harrier, and american bittern have all been reported as nesting in the adjacent Long Pond swamp. To date, a total of 10 rare moth species have been collected at the barren in 1985, including two new species for Pennsylvania, making this one of the most significant lepidoptera habitats in the State along with the Nottingham and Goat Hill serpentine barrens in Chester County and the Scotia sand barren in Centre County. In addition to the rare plant and animal species found at this site, the pine barren community and adjacent shrub swamp are outstanding natural entities unto themselves.

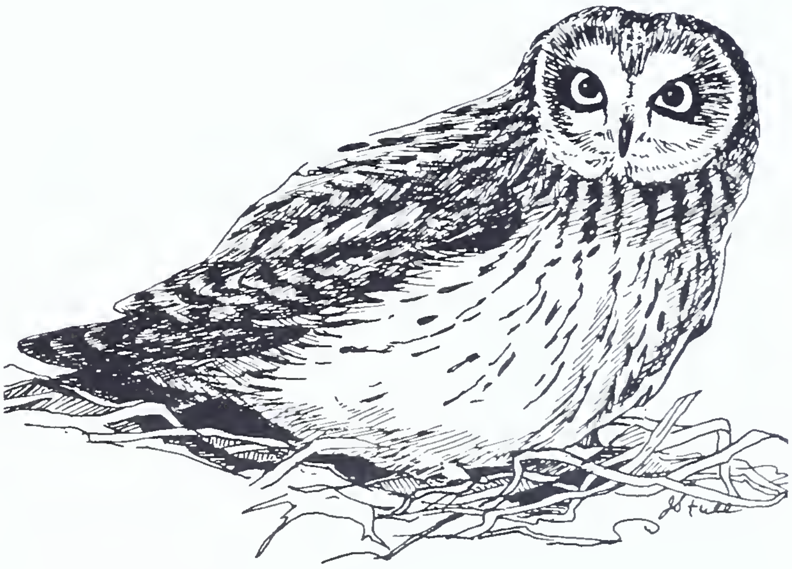
That this area is ecologically significant is easily documented. Protection and proper management may be another matter. Pine barrens are increasingly being altered through development, ground water withdrawal, and by the suppression of periodic natural fires that are needed to maintain and rejuvenate such habitats. In general, development is the greatest threat to pine barrens. Many areas have been converted for housing, commercial use, timbering, landfills, or for intensive recreational use. Of tremendous importance is the breakup of large areas into small islands by roads, power lines and trails. Such areas may be too small to provide enough habitat for species to survive, and such habitat breaks prevent necessary fires. The Pocono complex is currently pressed by development and many of the pitch pine areas have not burned for many years.

Work on the inventory and management of this significant natural area will continue as part of the field activities carried out by biologists working on the PA Natural Diversity Inventory. PNDI is a centralized repository for information and data collection on Pennsylvania's rarest and most endangered plants, animals, and exemplary natural communities. The program is currently funded by a grant from the Wild Resource Conservation Fund and contributions by the Western Pennsylvania Conservancy and The Nature Conservancy.

It is readily apparent that the pitch pine-bear oak barren habitats of Pennsylvania contain a disproportionate number of species of concern. As such, the pine barrens of the Pocono region should be recognized and protected as a significant natural habitat within the State. Fortunately, what so intrigued Pursh nearly two centuries past remains impressive even to this day.

SHORT COURSE ON RAPTORS TO BE OFFERED AT HAWK MOUNTAIN

The Hawk Mountain Sanctuary Association will offer a short course on "The Ecology and Conservation of Raptors" from January 2-11, 1986. The course will be based at Hawk Mountain, the world's first sanctuary created to protect migrating birds of prey, and it will concentrate on raptors in the winter season and during migration.



Through lectures, laboratories, and field projects, such topics as morphology and flight, behavior and ecology, population biology, and conservation and management will be covered. The intensive 10-day course will be academically rigorous, but informal, with a strong emphasis on personal instruction and team projects.

Dr. Paul N. Kerlinger will be the instructor, and guest lectures will be given by Dr. Mark Fuller, Jim Brett, and others. Dr. Kerlinger earned his Ph.D. in animal behavior/ecology at the State University of New York at Albany, and he has made extensive use of radar as a tool in the course of his studies on the behavior and flight patterns of migrating raptors and songbirds.

Students may receive three hours of undergraduate or graduate credit through their own institution or through Cedar Crest College in Allentown, Pennsylvania. The cost is $295, including tuition, room, and local transportation. The course will be strictly limited to 8-12 students. Non-degree students and highly-motivated amateurs interested in raptors and ornithology are encouraged to apply.

Please direct inquiries to: Raptor Course, Hawk Mountain Sanctuary, Rt. 2, Kempton, Pennsylvania 19529.

GROUPS SUPPORTING WILD RESOURCE CONSERVATION FUND

Academy of Natural Sciences, Philadelphia
American Fisheries Society, PA Chapter
Brandy Wine Conservancy
Carnegie Museum of Natural History
Citizens Advisory Council
Delaware Valley Clean Air Council
Garden Club Federation of PA
Hawk Mountain Sanctuary Association
Keystone Trails Association
Lehigh Valley Conservancy
National Audubon Society
National Wildlife Federation
PA Alliance for Environmental Education
PA Council of Trout Unlimited
PA Deer Association
PA Division Society of American Foresters
PA Federation of Sportsmen's Clubs Inc.
PA Federation of Women's Clubs
PA Forestry Association
PA Horticultural Society
PA Outdoor Writers Association
PA Wildlife Federation
Sierra Club, Pennsylvania Chapter
The Nature Conservancy
Western Pennsylvania Conservancy
Wildlife Society Pa Chapter

ANNUAL MEETING

The Wild Resource Conservation Board will hold its annual meeting on Wednesday, November 20, 1985, 1:00 p.m. at the Pennsylvania Game Commission Office, 8000 Derry Street, Harrisburg, Pennsylvania. A full report will be presented on the allocation of monies from the Wild Resource Conservation Fund and a formal funding plan will be adopted. The Board will consider all presentations made at the public hearing and the management plans outlined by the professional and technical staffs of the Pennsylvania Fish Commission, Pennsylvania Game Commission and Department of Environmental Resources.

The recommendations funded by the Board will be administered by the Pennsylvania Fish Commission, the Pennsylvania Game Commission and the Department of Environmental Resources. The recommendation selections will be based on their individual contribution to the management goals of the three agencies and those outlined in the Wild Resource Conservation Act.

DO SOMETHING
WILD

Wild Resource Conservation Fund
P.O. Box 1467
Room A1-85, 3rd & Reily Streets
Harrisburg, PA 17120

Address correction requested

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WILD RESOURCE CONSERVATION FUND
P.O. Box 1467 Harrisburg, PA 17120

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DO SOMETHING *WILD*

KEYSTONE WILD NOTES

A COOPERATIVE PROGRAM OF THE PA. GAME COMMISION, PA. FISH COMMISSION, PA. DEPARTMENT OF ENVIRONMENTAL RESOURCES AND DIRECT CONTRIBUTORS TO THE WILD RESOURCE CONSERVATION FUND

Volume II Number 2 WINTER 1986

YOUNG HERON SAVED!

Maybe You Can Make A Difference

By John Dunn, PGC Wildlife Biologist

The Great Blue Heron is Pennsylvania's largest wading bird. Each year populations of breeding adults return to a colony of nests referred to as rookeries or heronries. These heronries are usually occupied each year and may contain over 100 nests. Mercer County in the northwest part of the state contains 6 known heronries. One of the largest of these is the Brucker Heronry located southwest of the town of Greenville. This heronry is named for Edward Brucker, a retired finance executive with a special interest in herons. Ed lives in nearby Masury, Ohio, and spends many hours each week observing and studying herons in Pennsylvania.

Since 1979, Ed has been observing and reporting on the status of the heronry to the Pennsylvania Game Commission's Colonial Bird Survey and Cornell University's Colonial Bird Register. The Pennsylvania Game Commission monitors the population status of herons on a statewide level, while Cornell and the U. S. Fish and Wildlife Service monitor heron populations across the United States.

Because of the Great Blue Herons colonial nesting behavior and habitat requirements, it is susceptible to disturbance and nesting failure. For this reason, it has been listed as "vulnerable" by the Audubon Society and Pennsylvania Biological Survey. Furthermore, the Great Blue Heron is an important environmental monitor of wetland ecosystems. Herons are carnivorous, feeding primarily upon small fish, amphibians, reptiles and insects. By being at the top of the food web, they are sensitive indicators of environmental change and are susceptible to slight changes in quantity and quality of their food supply. Declines in heron populations can be an early warning sign that a wetland habitat is in trouble.

In late April during one of his many trips to the heronry, Ed discovered that a major gas pipe laying project had begun by an out-of-state contractor. The new pipeline was to pass within 200 feet of the heronry during a critical time in the nesting cycle when adults were incubating their eggs. Indeed, 17 of the estimated 95 nests in the heronry had already been abandoned due to the construction. Ed was immediately on the phone and in contact with Jack Samonski, Superintendent of National Fuel Company, the owners of the pipeline. He convinced Mr. Samonski of the importance of this heronry and of the immediate danger posed to it by the pipeline construciton. Mr. Samonski then ordered the construction to stop pending reassessment of the project. This quick action probably saved a significant part of the heronry.

At a later meeting between Ed, officials from National Fuel, and the Pennsylvania Game Commission, a plan was developed that would delay construction for 3 weeks. This would give the eggs time to hatch and allow the young-adult bond to become firmly established after which the adults would be less likely to abandon the nest's This also allowed the foliage surrounding the heronry to "leaf out" and provide additional cover for the nests. Ed knew that the herons would gradually become accustomed to the construction noises of chainsaws and bulldozers, and that the presence of men and loud voices would be the most disturbing. When construction was restarted, he convinced the workers not to shout at each other but to "talk softly"-a formidable task for a crew of men used to shouting on a construction project. National Fuel also provided close supervision of the work crews to see that things proceeded quietly.

Thanks to the concerted efforts of Ed Brucker and National Fuel, the survival of the heronry was ensured. Nesting success for 1985 was good with only a minimal loss of young--compared to the estimated 85 percent loss that the colony would have experienced had construction proceeded as originally planned. Officials at National Fuel have shown that industry is willing to conserve wildlife resources when given the chance. Their willingness to delay construction even though it meant added cost and inconvenience deserves recognition.

Often times individual citizens fail to get involved in conservation issues because they feel their efforts will not make a difference. By his willingness to become involved, Ed Brucker has shown that an individual **can make a difference!** We all should become involved and show our concern for habitat loss and wildlife conservation.

Wild Resource Conservation Board

WRCB ALLOCATES RECORD AMOUNT FOR PROJECTS

Pennsylvania's Wild Resource Conservation Board approved a record amount of projects ***$365,386.00.** The Wild Resource Conservation Board's annual meeting was held at the Pennsylvania Game Commission Office in Harrisburg.

The money allocated was the 1985 contributions collected from 1984 tax refunds and direct contributions donated to the Wild Resource Conservation Fund. Based on the June 30, 1985 closing date, $366,241.78 had been contributed by taxpayers using the tax check-off on their tax forms.

The allocation of funds was based on agencies need to survey undetermined populations of species. Some projects are beyond the surveying stages and moving towards recovery by re-introduction of species, such as the osprey and river otter. These projects are funded to increase public awareness, protect and to conserve the Commonwealth's remaining wild resources.

The approved projects include:

* $10,000—DER mini-grants for education and public awareness on wild native plants.

* $2,500—For continuing the inventory of wild native plants on Presque Isle. This will update a 1908 survey.

* $10,000—"Wild Resource Conservation Fund Activity Storybook" will be developed to increase the public awareness about wild resources within the Commonwealth. This book will be used throughout the state school system network.

* $35,000—Non-game wildlife biologist, this individual will be responsible for all activities dealing with non-game wildlife programs within the Pennsylvania Game Commission.

* $9,000—This survey is on-going and will help monitor 32 species for use in up-dating the computerized inventory system for small mammal research and management.

* $6,557—For the completion of the assessment and management of wildlife depredation at fish hatcheries.

* $24,246—The study intends to focus on the drainage of the Ohio River system (located in Pennsylvania) where 21 of 29 undetermined status species are found in this watershed.

* $43,000—Western Pennsylvania Conservancy to continue its database and field survey work on Pennsylvania Natural Diversity Inventory.

* $20,000—Status surveys of Endangered and Threatened Amphibians and Reptiles. A pressing need exists for surveys of the present occurrence and population of each species.

* $49,000—The Nature Conservancy to continue its database and field survey work on Pennsylvania Natural Diversity Inventory.

* $12,000—Pennsylvania River Otter, re-introduction program.

* $35,000—Pennsylvania Breeding Bird Atlas, the data gathered will provide a sound foundation for environmental planning at all levels of government. This study locates the breeding habitats of birds across the Commonwealth.

* $10,500—Support for Osprey hacking, monitoring returns and documentation of nesting behavior in the Commonwealth.

- $10,000—Field studies on Eastern Pennsylvania Plants of special concern to Morris Arboretun for input into Pennsylvania Natural Diversity Inventory.
- $3,000—Field survey the populations and habitats of the Eastern Woodrat in Eastern Pennsylvania.
- $2,500—Raptor identification workshop for District Game Protectors.
- $8,000—Extraction of useful data from organized snake hunts; this will better help to protect and manage the Commonwealth's existisng Timber Rattlesnake population.
- $5,100—Inventory and computerize the mosses of Pennsylvania.
- $69,983—To fund DER's Wild Plant Management Program. The Department, within the Bureau of Forestry is establishing a classification system designed to help protect special plant populations. A centralized computer database containing information on all of Pennsylvania's plants of special concern will be maintained by the Department. This is a statutory administrative mandated expense under Act 70-182.

The Wild Resource Conservation Fund was established in 1982 by the State Legislature. This fund is to help finance non-game wildlife and native wild plant programs carried out by the Pennsylvania Fish Commission, Pennsylvania Game Commission, and the Department of Environmental Resources.

Pennsylvania State Income Tax Return provides a space where taxpayers may donate to the "Fund" all or a portion of their Tax refund. As a reminder tax overpayments of $1.00 or less will not be returned to you. You can donate it to the "Fund", no amount is too small.

Friends of Wild Resource Conservation Fund may contribute directly to the "Fund". Checks should be made payable to the Wild Resource Conservation Fund and mailed to:

Wild Resource Conservation Fund, Comptroller
P.O. Box 2063
Harrisburg, PA 17120

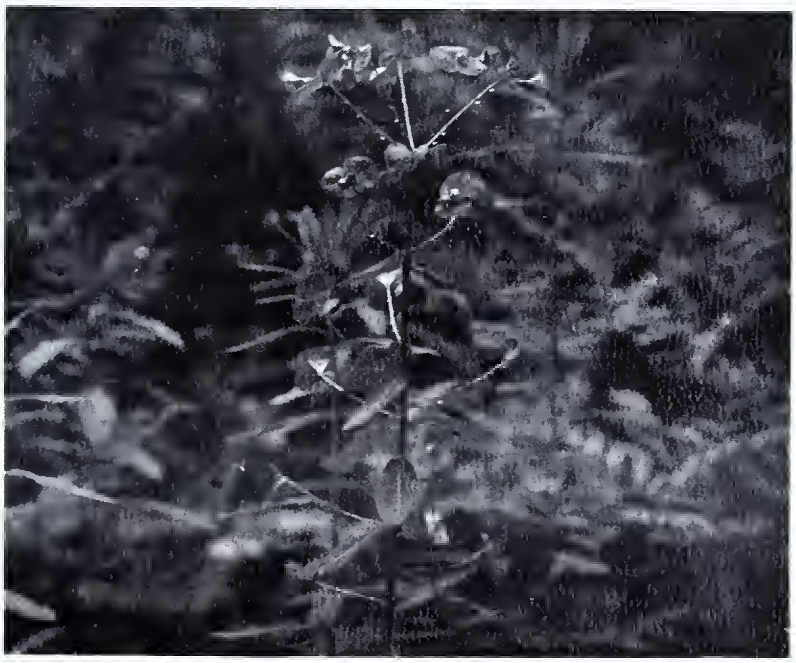

Photo credit: Tom Smith, PNDI-East

The Glade Spurge, *Euphorbia purpurea, in Pennsylvania*

by Tom Smith, Pennsylvania Natural Diversity Inventory, East

On the morning of May 23, 1985, I sat in a small cafe west of Harrisburg with Albert Mehring of the State Museum of Pennsylvania and Larry Klotz, a botany professor from Shippensburg University. Outside it was 45 degrees and pouring down rain. The rain wasn't letting up, the temperature was not rising, but what we hoped to find waiting for us in the woods near Lamb's Gap, Perry County, pulled us from our dry seats and hot coffee. Two hours later we found it, ***Euphorbia purpurea,*** the glade spruge, not seen in Pennsylvania in 23 years. This site was found as most are, checking plant collections housed at museums and universities to determine where the plant was found historically, and then attempting to relocate the site based on what are often very vague directions.

Glade spurge is a member of the Euphorbiaceae, the spurge family. The plant is a stout perennial ranging in height from three to five feet, the elliptic leaves are two to four inches long, one inch wide and arranged in a spiral up the stem. Its name ***E. purpurea*** apparently comes from its stem which turns a deep purple in August to September. it typically grows in cool, swampy woods which are saturated with water from limestone springs and seeps. These swamps, or glades as they are often called, support a lush flora indicated by such plants as spice bush, jewel-weed, royal fern, Turk's-cap lily, and jack-in- the-pulpit.

The species was historically known from a total of less than fifty sites in Pennsylvania, Ohio, New Jersey, Delaware, Maryland, Virginia, and North Carolina. Extensive searching in these states has resulted in a total of twenty-two sites; it has been lost entirely from Ohio, Maryland and Delaware. After locating our first population and establishing a good search image for the species, Inventory staff were able to locate four additional populations in Chester, York, Cumberland, and Fulton Counties. It appears that the plant was never common, and with the loss of its wetland habitat its status has rapidly declined.

The ***E. purpurea*** work carried out by PNDI staff was part of a region-wide effort in cooperation with similar statewide inventories throughout the East. The project was designed to accurately assess the rangewide status of a few top priority species being considered for federal listing by the U.S. Fish and Wildlife Service. This cooperative project will continue in 1986, focusing on additional plant and animal species of concern to the USF&WS.

Action is currently being taken to assure the protection of ***Euphorbia purpurea*** in Pennsylvania so that it will remain a part of our flora and not by lost as has apparently occurred in Ohio, Delaware, and Maryland. Fortunately one of "A's populations is located on the

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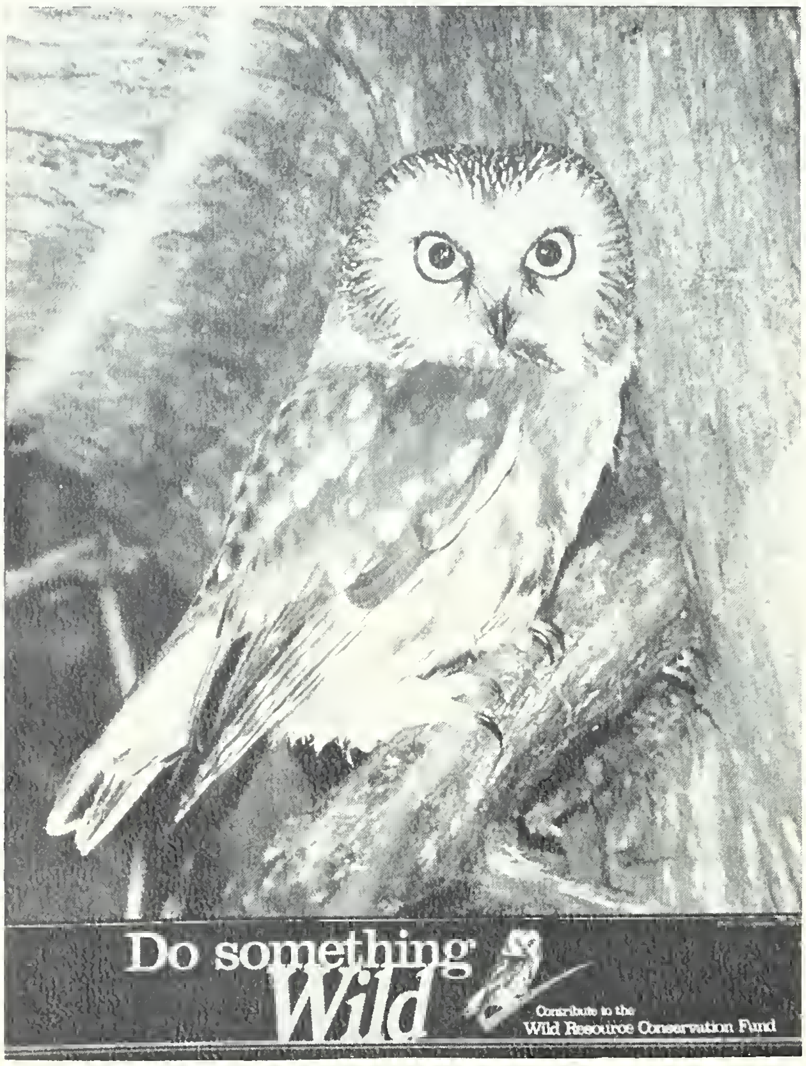
Goat Hill Serpentine Barrens Tate Forest Natural Area, itself a truely fascinating and rare natural community harboring many of Pennsyvlania's rarest plants and animals. An article on serpentine barrens is planned for an upcoming issue of the "Keystone Wild Notes".

Tom Smith is a plant ecologist with the Pennsylvania Natural DiversityInventory, an ongoing, systematic, scientific survey of Pennsyvlania's most endangered plants, animals, and exemplary natural communities. it is a data base and clearinghouse of accurate, current, site-specific information and staffed by trained professionals available to collect and interpret the data for use by land conservation organizations and public permitting agencies. The Inventory is supported through funds from the Wild Resource Conservation Fund and private donations. Pa. Natural Diversity Inventory, P.O. Box 1467. Harrisburg, PA 17120.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Pennsylvania's Faunal Frontier: The Green Salamander

by Charles Bier,
Pennsylvania Natural Diversity Inventory, West

Pennsylvania is the fourth most populous state and only thirty-second in land area. In addition, Pennsylvania is one of the most studied states from a natural history perspective. Yet, one of the obvious lessons that we continue to learn from projects like the Pennsylvania Natural Diversity Inventory, is that even in our relatively well biologically surveyed Pennsylvania, there are still unknowns awaiting discovery. The reclusive green salamander (Aneides aeneus) is such a quandry, and whose presence is only now being revealed.

The green salamander is a fascinating animal, and one of the most attractive amphibians inhabiting Penn's Woods. Adults grow to a slender five and one-half inches. Their dark grey-brown coloration is highlighted with a speckled pattern of light, lime-green, lichen-like markings. The newly hatched young are striking miniatures of their parents, but with flecks of golden color. As one of the "lungless" salamanders of the family Plethodontidae, the eggs and gilless young are not aquatic and require no water for development. Throughout life breathing is accomplished without the aid of lungs.

In addition, the green salamander is rock adapted. The expanded, squarish pads at the tip of each toe furnish a larger surface area for ease in climbing. The body, especially the snout, possesses a low flattened profile appropriate for crawling in narrow crevices.

Exhibiting a rather narrow, diagonally shaped range, this salamander is found from northeastern Mississippi, northeast along the Appalachian Mountain chain, to extreme southwestern Pennsylvania. Portions of only eleven states are included. What makes this species even rarer, is its preference for a very specific microhabitat, which for the most part is provided by large outcrops of sandstone, particularly of the geologic Pennsylvanian period's Pottsville Group. Cracks and crevices within blocks and cliff faces of such rock are colonized if their shape, pattern, size, moisture, temperature, and lighting are all suitable to the green salamander's ecology.

The entire life cycle of this remarkable salamander revolves around its "niche" as a crevice dweller. In early spring males emerge, presumably from deep hibernating clefts, to seek out the proper "breeding" crevices. Tusseling duals may take place between males who bite and push during competition for the best sites; where females will soon arrive to mate. A dozen or more eggs are cemented to the top of the brooding crevice by the pregnant females, who for more than two months guard the eggs and young hatchlings. Indeed, I have been amused by fierce finger-size mothers who have lunged to bite by wire research probe when inserted into their brooding crevices. Thus, although sometimes found in nearby trees, the green salamander is rarely viewed outside its rock crevice world. Exceptions are during the night, or during cloudy days with light rain, when individuals explore the surrounding rock surfaces.

It was not until August 1951, that the green salamander was added to the list of our Commonwealth's herptofauna. Dr. Neil Richmond, herpetologist with the Carnegie Museum of Natural History in Pittsburgh, hypothesized that a colony should exist in Pennsylvania just north of a known site in Monongalia County, West Virginia. Dr. Richmond did in fact discover such a site at "Wymps Gamp" near the state line in southern Fayette County. Although further searches were conducted in other seemingly suitable habitats, additional populations could not be located.

Subsequently, no new information describing the green salamander in Pennsylvania was generated. Furthermore, because the exact location of Dr. Richmond's discovery was unknown, the continued existance of this species in our state could not be verified. Rock quarrying and forest clear-cutting were both active at Wymps Gap and could have eliminated any salamander colony's habitat.

Realizing the concern for this species in states throughout its range, the Pennsylvania Fish Commission classified the green salamander as a "Threatened" species under the fish code. The U.S. Fish and Wildlife Service has also called for a range wide review of the species' status, as it pertains to the Endangered Species Act.

Yet nothing new was known about the elusive green salamander in Pennsyvlania until in cooperation with the Carnegie Museum of Natural History, and the Pennsyvlania Fish Commission, staff members of the Pennsyvlania Natural Diversity Inventory began to research the salamander's potential range and habitats. During the autumn of 1983, the facts about this part of Pennsyvlania's unknown wildlife frontier began to surface.

This geology of the southern Allegheny Mountains held most of the secrets. The most difficult task was locating potential rock habitats within the rugged mountain terrain. The Pennsylvania Bureau of Topographic and Geologic Survey assisted by providing aerial photographs and some surface geology trace maps. Pennsyvlania Game Commission foresters aided the endeavor by making available maps of forest types and land features on Commission properties. A small aircraft reconnaissance flight provided even more data. Visits to existing colonies in West Virginia, Ohio and Maryland, have been made to assess known habitats. And finally, many hours of field work have been logged scrambling along cliff bases, gingerly climbing past coiled copperheads, and squinting into literally thousands of rock crevices with flashlight in hand.

The results are exciting; a mid-project summary of our progress to date shows that five thriving green salamander colonies have now been discovered. And, the northern limit of the range of this species has been extended more than twenty miles northeast to the Youghiogheny River gorge in northcentral Fayette County. The discovery of several additional populations are yet anticipated as research continues in 1986.

Probably the most significant find of the green salamander research occurred in a deep Chestnut Ridge Valley during a sudden thunderstorm last June. I was actually engrossed in a survey for rare plant species in State Game Lands Number 51, when an unexpected downpour caught me off guard. Spying a large rock outcrop I made a be-line for cover beneath an overhang. While waiting out the storm I decided to investigate the shaded cliff face. You guessed it; a new green salamander colony, and this one is on public land.

A few more surveys during the following months collected data on two extensive populations. One of these included five brooding mother salamanders with egg clusters; and later tiny young.. As an added bonus, a family of the state threatened eastern woodrat (Neotoma floridana) was also found inhabiting the larger fractures in the unique, massive, sandstone cliff habitat within the Game Lands.

Photo credit: Charles Bier, PNDI-West

The green salamander is but one of the mysteries being unraveled by biologists supported by the Wild Resource Conservation Fund. With precise and up-to-date information in hand, the status of Pennsylvania's plant and animal life can continue to be evaluated. After examining many outcrops in three counties, it is becoming apparent that the green salamander is a threatened species in Pennsylvania. In addition to confirming its status, we now have a better understanding of the uniqueness of its habitat. Now sound management schemes can be composed to protect the known colonies from possible destruction.

If species like the green salamander could speak up for themselves, I am certain that they would express their gratitude to all of those Pennsyvlanians who have furthered our knowledge of rare and endangered plants, animals, and their habitats, by donating to the Fund.

Wild Resource Conservation Board

Elect Chairman

At the annual meeting of the Wild Resource Conservation Board (WRCB) Peter S. Duncan Executive Director of the Pennsylvania Game Commission was elected chairman. Act 1982-170 requires the chairmanship of the Wild Resource Conservation Board to rotate on an annual basis among the members.

The chairman is responsible for calling meetings of the Wild Resource Conservation Board and presiding over said meetings. The chairman has been delegated by the Wild Resource Conservation Board to be direct liason between the Board and the Wild Resource Conservation Fund Executive Director's Office.

Other members of the Wild Resource Conservation Board are Nicholas DeBenedictis, Secretary of Department of Environmental Resources, Ralph W. Abele, the Executive Director of the Pennsylvania Fish Commission, Representative George C. Hasay, Minority Chairman of House Conservation Committee, Representative Camille "Bud" George, Majority Chairman of the House Conservation Committee, Senator D. Michael Fisher, Majority Chairman of Senate Environmental Resources Committee and Senator Raphael Musto, Minority Chairman of the Senate Environmental Resources Committee.

The Wild Resource Conservation Board administers the voluntary tax check-off contributions from the citizens of the Commonwealth. The tax check-off is a way for all interested individuals to support the protection and management of our wild resources.

Photo Credit: PA Game Commission
Chairman Ralph W. Abele, (Right) Executive Director of the PA Fish Commission turns the gavel of responsibility over to newly elected chairman of the Wild Resource Conservation Board, Peter S. Duncan (Left) Executive Director, of the PA Game Commission.

Due to a communications break down, "Keystone Trail Association" has not authorized the use of their name on our groups supporting list. As of this issue they will be removed.

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Volume II Number 3 **SUMMER 1986**

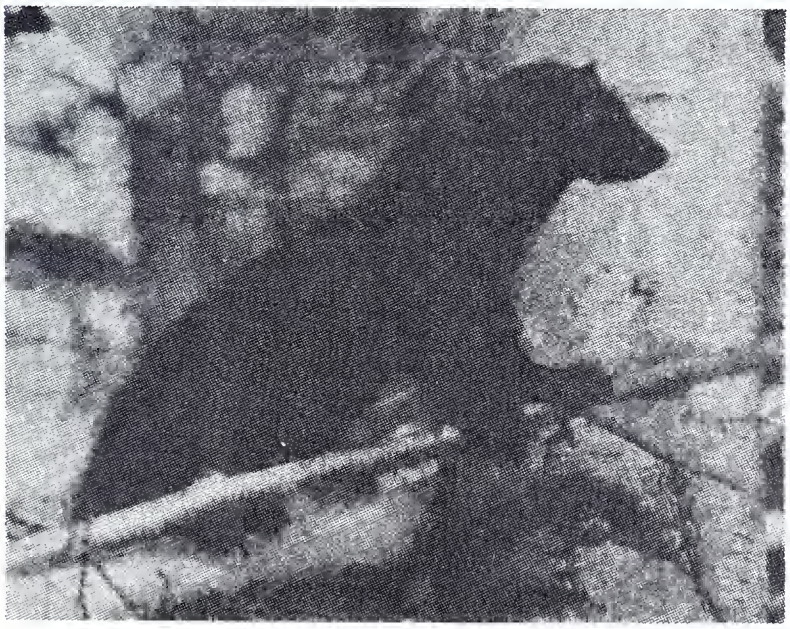
A FEATURED SPECIES

STATUS UNDETERMINED

FISHER
Martes pennanti pennanti (Erxleben)
Family Mustelidae
Order Carnivora

OTHER NAMES: Pekan, Pekan cat, Pennant's marten, fisher marten, fisher cat, fisher weasel, black cat, black fox.

DESCRIPTION: The fisher is one of the largest members of the weasel family. It is usually brown on the upper back, shoulders, and head. While sometimes mistaken for a large black cat, its limbs are much shorter, body much narrower, and its long bushy tail tapers toward its tip. Its head is broad, but narrows at the snout, and has short rounded ears and small eyes. Males are much larger than females and have a coarser pelt. Average total lengths and tail lengths of males and females, respectively, are 940 mm, 350 mm and 810 mm, 310 mm. Males average 3.7 kg in weight, whereas females average 2.1 kg.



LIFE HISTORY AND ECOLOGY: The fisher is arboreal, although less so than the closely related marten, Martes americana. It thus includes in its diet some prey which are also arboreal, such as red squirrels (Tamiasciurus sp.), flying squirrels (Glaucomys sp.), and porcupines (Erithizon dorsatum). Snowshoe hares (Lepus americanus), voles, mice, and other small mammals, carrion, birds, and fruit round out the diet. Mammals are thought to comprise about 80% of its food. Fishers are particularly well adapted for killing porcupines and may exercise some control over their population.

The home range is approximately 26 km^2 in which they travel in regular hunting circuits. The males' home range is more extensive than that of females. Fishers are active both day and night.

Fishers have delayed implantation and thus, they have an unusually long gestation period (average 352 days). Breeding occurs in March and April. Average litter size is 2.7. The young are born helpless and may not reach sexual maturity until 2 years of age.

Estimates of fisher population densities are highly variable and have been reported to range one animal per 0.65 km^2 to one per 285 km^2. More recent estimates are based on a combination of radiotelemetry, live-trapping, and systematic analysis of questionnaires sent to trappers and game officials. This information suggestes that fishers achieve maximum densities of no more than one per 13 km^2.

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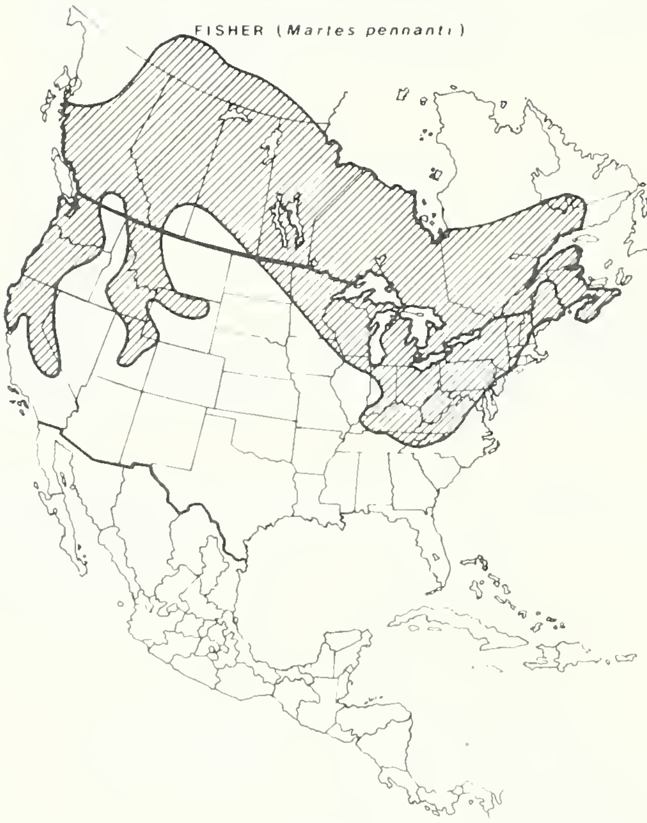


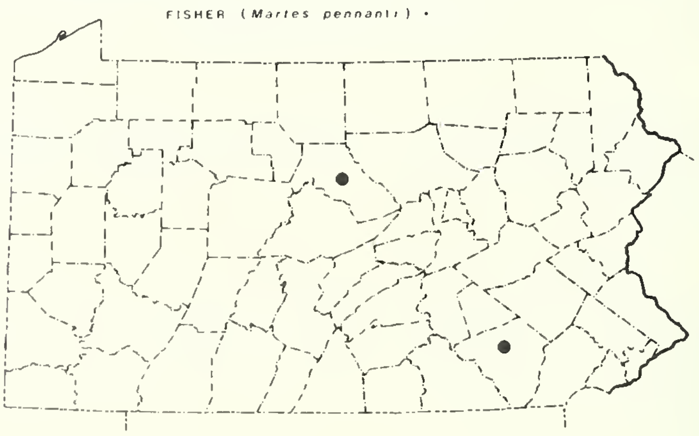
RANGE: The distribution extends from extreme northwestern Canada southward via the Rocky Mountains into Montana, Idaho, and Oregon, and via the Sierras into California. In the east, the geographic range includes all of Canada south of Hudson's Bay; the upper mid- western, middle Atlantic, and New England states. Records indicate fisher once occurred as far south as West Virginia, Tennessee, and western North Carolina. Its distribution is similar to that of the marten but does not extend as far northward.

HABITAT: It is generally agreed that the fisher requires a habitat with a continuous closed canopy such as in spruce-fir forests and other conifer association. However, they are more likely than martens to be found in hardwoods, especially beech woods and dense second growth forests. They tend to avoid open areas or sparsely covered forests.

BASIS OF STATUS CLASSIFICATION: There seems to be indirect evidence that fisher do still exist or have been reintroduced to Pennsylvania. There are no verifiable records, however, upon which to establish status other than "Undetermined."

A letter was sent to a representative game protector from each of the 67 counties of the Commonwealth. There were 26 responses of which three provided positive information on fishers. From Lehigh County, it was reported that a fisher had been killed by dogs in a fencerow between two fields. The animal had ear tags identifying it as a native of New York State and had been released by the New York Conservation Department in a trap and transfer program. Fulton County reported "rumors" of a fisher being killed just south of the county, in West Virginia. A game protector of Clinton County could give no verified records of fisher, but felt that reports of "black panther" sightings might well be fishers. He had also sent a picture of a carcass of a possible fisher to Dr. John George at The Pennsylvania State University, Univerity Park (personnel communication) for verification. George said the carcass was rather badly decomposed and could not determine if it was a fisher—although it could very well have been. Dr. George is convinced that fishers do exist in Pennsylvania and he cited the six or seven instancesof reports of "black panthers" being seen, particularly from Wayne, Pike and Clinton counties. He also saw the tracks of a large mustelid in Elk County in 1967. In 1981 he received a call from a woman in Centre County complaining of "a large black animal" which had been harassing her cat and which was capable of "climbing trees and catching squirrels."

Fishers were reported to be rare or non-existent in Michigan and Wisconsin by the late 1920's, and a similar decline in their population was seen throughout most of their range in eastern North America. Fishers at one time occurred throughout all of the north- eastern half of Pennsylvania, extending as far south as Forest, Elk, Clearfield, Centre, Cumberland and Lancaster counties but the last one was reported in 1921 from Holtwood in Lancaster County. The last record of a fisher in north-central Pennsylvania was from Clinton County in 1901, while the species had vanished from northwestern Pennsylvania by 1900.



Logging and burning of forests as well as the high prices formerly paid for their furs are the usual reasons set for the decline of fisher populations throughout its range. Curtailing trapping seasons for several years and restocking programs have led to the successful reestablishment of fishers in several areas of their range. Noteworthy among these are Montana, Michigan, Wisconsin, Nova Scotia, and New York. Indeed, if the "black panther" reported and other previously mentioned sightings from Pennsylvania prove to be fisher, it may well be that it is a result of the overspill from the New York reestablishment of the species in the Adirondacks.

RECOMMENDATION: It appears obvious that if a more accurate appraisal of the status of the fisher in the Commonwealth is to be attained, a rigorous research effort should be launched in the areas where the most frequent "black panther" sightings have been recorded. Extended observation periods coupled with live-trapping attempts are strongly suggested as the means to this end.

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PREPARED BY: Harry N. Cunningham, Jr., Division of Science, Engineering and Technology, Behrend College of The Pennsylvania State University, Erie., PA 16563.

The text used for the following article was taken from "SPECIES OF SPECIAL CONCERN IN PENNSYLVANIA".

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PENNSYLVANIA'S CAVITY NESTER COOPERATORS

by John P. Dunn
Pennsylvania Game Commission

Pennsylvania's Cavity Nester Cooperators is a statewide network of volunteers concerned about the future of bluebirds and other cavity-using wildlife. This network of volunteers was organized in 1984 and was formed to:

1. Recognize the efforts of individuals helping cavity-using wildlife.
2. Help make these efforts as effective as possible through the exchange of information, and
3. Monitor nest box use trends and their effectiveness in differing habitats in Pennsylvania.

Loss of habitat from development, fence row removal, increased fuel wood cutting, fewer wooden fence posts, and destruction of natural tree cavities through timber harvesting have reduced the number of nest sites available for cavity dependent birds and animals. Properly constructed and maintained nest boxes aid cavity users providing nesting sites that otherwise would not exist. They are particularly beneficial in habitats lacking large hollow trees or other natural cavities.

Providing cavity nesting birds with housing has been a popular hobby for Pennsylvanians who enjoy wildlife around their homes. Some individuals, however, have taken their "hobby" beyond their own backyard and into the surrounding countryside. Bluebird "trails" composed of 5 or more nest boxes have been established in favorable habitats and are maintained and visited regularly during the nesting season. Not only do these trails aid bluebirds, but they also provide biologists and ornithologists with the necessary information needed to understand and maintain populations of cavity nesting birds.

1985 Nest Box Summary

Twenty-two cooperators sent in nest box records on 1302 bluebird, 86 kestrel, 4 wren, 72 woodchuck, and 5 squirrel nest boxes. A total of 1490 bluebirds were reported fledged from these boxes. Bluebird boxes were also used by other cavity nesting birds. Other species reported fledged from bluebird boxes included 1178 tree swallows, 411 house sparrows, 57 chickadees, 7 tufted titmice, and 5 white-breasted nuthatches.

Bluebirds were reported fledged from 9 different habitats. Over one-half of the bluebirds fledged occurred in old fields and cropland/pasture habitats. The second most productive habitat was cropland/pasture adjacent to forested land.

Rural residential areas bordered by old fields were the most productive habitat for both tree swallows and house wrens. Cropland/pasture adjacent to old fields were also important. A total of 431 tree swallows and

141 house wrens were fledged from 8 different habitat types.

The rural residential adjacent to old fields and the cropland/pasture bordering forested land habitats were used by the greatest number of species. Nest boxes in these 2 habitats were used by 4 species (bluebirds, tree swallows, house wrens, and chickadees.)

Reports were also received from other types of nest box structures. Three cooperators reported on 87 kestrel boxes that were used 24 times and produced over 90 young. Nesting by wood ducks was reported from 72 nest boxes that produced 8 nests. Two of the 4 wren boxes reported were used by house wrens, and 5 squirrel boxes produced 3 litters of grey squirrels. Many other species of birds and mammals were found to also utilize these boxes, including deer mice, flying squirrels, grey squirrels, starlings, and screech owls.

You can join the effort to monitor Pennsylvania's cavity nesting wildlife. Anyone erecting 5 or more nest boxes and checking those boxes at least once during the nesting season can become a volunteer by writing to:

Nest Box Records
Pennsylvania Game Commission
Division of Game Management
P.O. Box 1567
Harrisburg, PA 17105-1567

As a volunteer you will recieve a nest box summary form to complete when you check your boxes, an annual summary report outlining effectiveness of boxes in different habitats, and recommendations to improve nest box success. Periodic workshops are also scheduled to allow exchange of ideas and useful tips. More importantly, you will be helping to maintain and monitor Pennsylvania's cavity nester resource.

RARE PLANTS OF THE DELAWARE RIVER CORRIDOR

Ann F. Rhoads
Director of Botany
Morris Arboretum of the University of Pennsylvania

The Delaware River forms the entire eastern boundary of Pennsylvania. Often regarded as a significant natural barrier, the river also serves as an important corridor for the movement of plants and animals. Migrating birds have followed the river's course for thousands of years. Before the advent of roads and railroads, the Delaware was used extensively for human travel. Millions of board feet of lumber harvested in northeastern Pennsylvania and New York were rafted down the river during the 1800's. Coal and farm products also moved along the river and associated canal system.

The movement of plants has also been influenced by the river. Along the lower stretches of the Delaware, many southern coastal plain species reach the northern limit of their natural range. Similarly, the upper Delaware is home to a number of plants which are more abundant further north but have moved south along the river corridor. Studies by a team of field botanists from the Morris Arboretum working in conjunction with the Pennsylvania Natural Diversity Inventory have, over the past four years, provided an up-to-date view of the status of rare plants found along the Delaware River.

The Delaware Estuary comprises the southernmost section of the river, from the fall line at Trenton, New Jersey, to the Delaware Bay. While the water in the Pennsylvania portion of the estuary is fresh (not salty), the tidal influence is important. Twice daily, river levels rise and fall, creating an intertidal zone along the banks which is alternately inundated with as much as six feet of water and exposed to the sun and wind. This fresh water intertidal habitat calls for a very specialized group of plants which can tolerate the fluctuating environment. Eight species of plants which are found nowhere else in the State occur in the tidal marshes along the Delaware River.

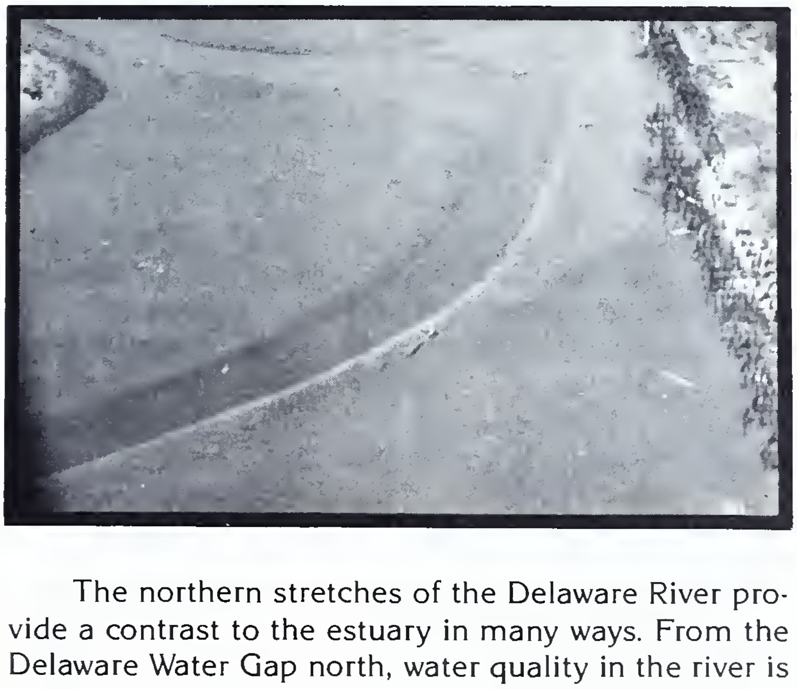
These include swamp beggarsticks **(Bidens bidentoides)** which is listed as endangered in Pennsylvania. This species was, at one time, being considered for federal listing but has been dropped back to inactive federal C-3 status. Arrowhead **(Sagittaria calycina** var. **spongiosa),** which is listed as endangered in the State, is known from only two locations along the lower Delaware. In the Pennsylvania rare category are: waterhemp ragweed **(Amaranthus cannabinus),** Walter's barnyard grass **(Echinchloa walteri),** little-spike spikerush **(Eleocharis parvula)** found for the first time in Pennsylvania in 1984, subulate arrowhead **(Sagittaria subulata)** and Smith's bullrush **(Scirpus smithii).** Another intertidal species, Wright's spikerush **(Eleocharis obtusa** var. **peasei),** is currently listed as tentatively undetermined.

Unfortunately, due to the combined effects of reduced water quality and habitat loss resulting from river-front development in Philadelphia, Bucks, and Delaware counties, at least seven other species which once occurred in the area have been lost.

Those apparently extirpated include: sensitive joint vetch **(Aeschynomene vriginica),** water pigmy-weed **(Crassula aquatica),** long-stemmed water-wort **(Elatine americana),** Parker's pipewort **(Eriocaulon parkeri),** awl-shaped mudwort **(Limosella australis),** Nuttall's mudflower **(Micranthemum Micranthemoides),** and arrowhead **(Sagittaria stagnorum).**

Several rare tidal marsh species which also occur in other wetland habitats in Pennsylvania include: Wild rice **(Zizania aquatica),** river bullrush **(Scirpus fluviatilis)** and riverbank quillwort **(Isoetes riparia).** The riverbank quillwort has been deleted from the most recent version of the state rare plant list as it has been found to be relatively abundant along portions of both the Delaware and Susquehanna River systems.

The extent to which habitat degradation and resulting loss of species has occurred on the lower Delaware is evident from a comparison of historical and current plant records from the Tinicum area. The area from the mouth of the Schuylkill River to the mouth of Darby Creek was once a vast tidal wetland system. Now the site of the Philadelphia Inter- national Airport, shipyards, bulk oil handling facilities, and other industrial plants, little remains of the original marshland. Even within the Tinicum National Wildlife Refuge, impoundments and invasion by exotic species, particularly purple loosestrife (Lythrum salicaria) have drastically altered much natural habitat. Historical records show that 40 rare intertidal and coastal plain species once occurred in the Tinicum area. Only four of those can be found today.



The northern stretches of the Delaware River provide a contrast to the estuary in many ways. From the Delaware Water Gap north, water quality in the river is excellent, and many portions of the river bank remain in natural or semi-natural condition.

This portion of the river is home to several plants which are more abundant further north. Roseroot stonecrop **(Sedum rosea)** is a plant of moist cliff habitats. Known presently from two Pennsylvania sites along the Delaware in Bucks and Pike Counties, its range extends into Arctic regions. The prostrate sand cherry **(Prunus pumila** var. **depressa)** is another northern plant which has migrated down the Delaware corridor. It reaches the southern limit of its natural range on alluvial sand and gravel deposits from Callicoon, NY, south to the Water Gap. Both the roseroot stonecrop and the prostrate sand cherry are listed as rare in Pennsylvania.

Chamisso's miner's lettuce **(Montia chamissoi),** a Pennsylvania endangered plant, is found at two sites along the upper Delaware between Long Eddy and Hancock, New York. This species has been described as "the most disjunct species in Pennsylvania" (E. T. Wherry—Bartonia 34:7). The main range of the species is from Alaska to New Mexico, Arizona and California. The closest known stand to those in Wayne County, Pennsylvania, is in Minnesota, some 600 miles distant. This species was identified by Dr. Wherry in the 1950's during work on the **Atlas of the Flora of** Pennsylvania. The specimens, originally collected in 1884, had formerly been misidentified. Wherry was unable to relocate the population in 1964. During field work in the Upper Delaware Scenic and Recreational River corridor in July 1984, the Morris Arboretum team discovered two additional populations of **Montia** at sites along the river a few miles north of the original location, thereby restoring this curious plant to active status on the State list.

Extensions of the northern and southern floras, such as occur along the Delaware River, are an important factor in the floristic diversity found in Pennsylvania. Similar examples could be cited for the Susquehanna, the other major north-south river system in the State. Through a grant allocated by the WRCB to the Morris Arboretum, additional rare plant survey (inclusive of the Middle Delaware River corridor) will be supported during 1986 to continue this valuable inflow of information necessary to describe the present status of Pennsylvania's native wild plant diversity.

PENN STATE STUDYING 29 UNCLASSIFIED FISH

University Park, Pennsylvania—The Classification fate of more than two dozen fishes considered native to Pennsylvania hangs in the balance as a Penn State professor searches for evidence of their existence in the state.

Jay Stauffer, associate professor of fisheries science, says that of 159 species of fishes in Pennsylvania waters, 16 have become extinct, four are endangered and 29 are "undetermined," relative to threatened or endangered status.

Undetermined means that it is not known if the fisheries are threatened or rare. We just don't have the information about natural history or distribution that we need. We want to take them off the undetermined list one way or the other.

All but eight of the fish are native to the Ohio River drainage system, a fact that does not surprise him. The Mississippi River was the center of evolution and dispersal, which causes the Ohio River basin tributaries, like the Allegheny and Monongahela Rivers to be more diverse than the Atlantic slope drainage, like the Susquehanna River.

Because the Allegheny is the most eastern tributary of the Mississippi, Pennsylvania may simply be on the peripery of the natural range for many species, Stauffer says. Therefore, some fish may be considered rare in the state for the wrong reason.

He cites the silver chub as an example. "This is one of the fish that I would argue is in Pennsylvania at best peripherally. It is abundant throughout its range, but not this state. The historical record includes one specimen found in Lake Erie, but we found none there this summer."

Also on the list the Tippiecanoe darter. We found it to be more common in Pennsylvania than historical documents suggest, but it is still not common throughout its range. This fish may be reclassified as threatened or endangered. Although these fishes may no longer be commercially important (if they ever were), the classifications are important. These fishes in general form very important steps in the food web and thus may be very important to the commercial and recreational fishing industry. A Smallmouth bass might have a hard time making it without some of these fishes, which are critical elements of the food chain.

The fishes are important for environmental reasons as well. The fish are indicative of water quality. These fishes are sensitive to different kinds of stresses and these are some of the most pristine streams in the state. Their presence or disappearance could be as good as a litmus test, to water quality.

Stauffer said that this past year he searched for evidence of the fishes, primarily in waters north of Pittsburgh, and will now work on determining the extent of populations in the state. The undetermined fishes include minnows, sunfish, suckers and madtom catfish, a four-inch species that lives in the riffles of streams and comes out primarily at night.

Longhead Darter (*Percina macrocephala*) Photograph by E. L. Cooper

The results will be used by a Pennsylvania Fish Commission Advisory Committee on fishes, this is a state-established advisory committee, which will determine new classifications for the 29 species classified as undetermined. The committee is made up of Ed Cooper, Penn State professor emeritus of zoology; Robert Denoncourt, York College of Pennsylvania; Charles Hocutt, University of Maryland; Clark Shiffer, Pennsylvania Fish Commission; and Stauffer.

Stauffer says that the research project also was aided by the fund, known commonly as the 'Do Something Wild' check-off on state income tax returns. Stauffer's study financed through the Wild Resource Conservation Fund with the Pennsylvania Fish Commission administrating the project.

State income tax filers who directed refunds to go to the state's Wild Resource Conservation check-off contributed directly to the $24,000 nongame project.

Stauffer says the project will end as soon as the council makes its determinations. "One way or another, each of the 29 fish will be off the unknown list."

Direct Contributions Reach All Time High

Many citizens cannot make a contribution to the Wild Resource Conservation Fund by checking off your tax refund. The state income tax is calculated so close, the majority of taxpayers do not receive a refund. Approximately 25% of the 5.3 million tax forms filed receive a refund.

So, concerned individuals make direct contributions to the Wild Resource Conservation Fund throughout the year. The fiscal year of the "Fund" follows the Commonwealth's fiscal year July 1 to June 30. This fiscal closing gives the "Fund" a stable figure to allocate funds for the annual meeting in the fall.

Direct contributions have been received by some very innovative methods. The contributions created a new concept of giving money to help all the wild resources of the Commonwealth.

Trash to Cash

* Hershey Park ZooAmerica sponsored a recycling day and the money they raised was donated to the Wild Resource Conservation Fund. They collected 46 pounds of bi-metal cans, 33 pounds of aluminium cans, 1,393 pounds of glass and 3,000 pounds of newspaper in 1985. This resulted in a contribution of $100 after all expenses were taken care of. In 1986, they collected 50 pounds of bi-metal cans, 159 pounds of aluminium cans, 1,541 pounds of glass and 3,500 pounds of newspaper. This will also result in a donation to the Wild Resource Conservation Fund. Just think of all the 4-H clubs, Boy Scout and Girl Scout organizations turning trash to cash for the wild resources in the Keystone State. Also, just think how much trash would be removed from the solid waste system of the state land fills.

* An anonymous donor from the southeastern part of the Commonwealth contributed $29.50 from their Lotto winnings of February 3, 1986. The individual picked four numbers and donated it all for the wild resources.

* The student's of Mr. John W. Kuskoski's class at Bishop Carroll High School in Ebensburg had organized a Walk-A-Thon for wild resources. (At press time we had no figures of what was raised by the students.)

* The Wild Resource Conservation Fund has been made the beneficiary of a retirement policy of a state employee.

* A substanial amount of donations was received in lieu of flowers, memorial contributions for Mr. Timothy E. Myers. Tim 24, of Dillsburg, was killed in a head on traffic accident on April 1, 1986. It was kind of the Myers family to think of the Wild Resource conservation Fund in their time of family sadness.

As you can see there are many people in the state that are concerned about our natural heritage. The decision on management and protection of these species, will determine the future legacy we leave for the generations yet to come.

Congratulations and a hardy thank you for a job well done to all those people that care about the future.

Osprey Happenings

The Wild Resource Conservation Fund has funded for additional work to be conducted at the Osprey hacking sites in the Poconos. The documentation of actual nesting is the top priority for the field staff.

Strange things are happening in the Poconos as of the writing of this issue. You will have to read the next issue of "Keystone Wild Notes" to be informed of the continuing saga of the Osprey. We know this for sure, we have a nest and the birds have laid eggs. Until the next issue.

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KEYSTONE WILD NOTES

A COOPERATIVE PROGRAM OF THE PA. GAME COMMISION, PA. FISH COMMISSION, PA. DEPARTMENT OF ENVIRONMENTAL RESOURCES AND DIRECT CONTRIBUTORS TO THE WILD RESOURCE CONSERVATION FUND

Volume III Number 1 FALL 1986

Pennsylvania Osprey Success Story

In the fall of 1979 a graduate student, Charles Schaadt, approached Dr. Larry Rymon of the Department of Biology at East Stroudsburg University with an idea. The idea was to attempt an Osprey reintroduction effort in the Poconos by means of a method known as hacking. To their knowledge no one had ever attempted this method with this species.

Dr. Rymon had been working with birds of prey for a number of years and was familiar with the process of permit acquisition, handling and care of raptors. They knew of several similar restoration projects with Peregrine Falcons and Bald Eagles but Ospreys presented a totally new frontier.

The first birds translocated to Pennsylvania were brought up from the Chesapeake Bay in the summer of 1980. Six nestlings between five and six weeks of age were brought to 20 foot platforms or hack towers where they were hand fed and cared for until they were 8 weeks old. At this age they take their first flight from the towers.

Mike Worley, Commonwealth Media Services

The entire effort was directed toward the eventual goal of having them return to the area of release as breeding adults when they were 3 to 5 years old. The researchers knew that they would migrate to tropical America in the fall of their first year of life and would not be seen again until they were at least 2 or 3 years old.

One key to success in the program was whether or not the newly released birds would instinctively learn to fish with no natural parents in the area. They did and during their learning period the support team provided them with supplemental food until they were totally independent.

The process of nestling transfer and careful hand rearing continued each year following the initial 1980 efforts. The next key to success would be birds returning to the Poconos instead of their hatching locations on the Chesapeake. In 1984 the first 3 birds returned. All were 2 year old 1982 releases and all stayed near their original artificial rearing sites during that summer.

The number of birds brought up from the Chesapeake grew from summer to summer and by 1986 a total of 111 Osprey chicks had been translocated and reared on Pocono hacking towers.

The first sign of nesting was recorded in 1985 when four nests were located. These were the first documented Osprey nests to be found in the Commonwealth in many decades. Unfortunately no eggs were produced that year.

The big season was yet to come! On April 5, 1986, Dr. Rymon was making his usual early spring survey of hacking areas to look for returning birds. It was a cold, damp and foggy morning when he heard the familiar "cheep, cheep, cheep" call of an Osprey. The call turned out to be that of a 4 year old male dubbed "Light Green" for his colored plastic leg bands. These bands, together with his aluminum Federal band, quickly verified his

DOCUMENTS SECTION

Mike Worley, Commonwealth Media Services

identity. He had been hand reared at Portland and had shown up there in 1984 and 1985 without a mate. But this time was different, he was soon joined by an unbanded female and nest building, egg laying and the production of one chick followed during the summer of 1986. Soon after the discovery of this return a pair of color banded birds were located at a lake in the Poconos and they too had started a nest. This pair laid three eggs and produced three young which developed well and flew from the nest later in the summer.

During the course of their search for other returning Ospreys this summer Dr. Rymon and his field assistant, Bruce Fortman, found four other nests making a total of six. They also identified 20 banded returned Ospreys from previous years. A great feeling of satisfaction has spread among the researchers and all those who have been waiting for the Osprey's return.

Everyone involved had believed and continued to hope each year that the translocated young would come back and start a new population of inland nesting, but it was not until this summer that it was proven.

Dozens of student interns, several graduate students and Dr. Rymon have given thousands of hours of dedicated service to this project but it would not have been possible if it had not been for financial support from several sources. The Pennsylvania Game Commission's Working Together for Wildlife Program, the Pennsylvania Chapters of the National Audubon Society and The Wild Resource Conservation Fund have all helped to bring this endangered raptor back from the edge of extinction. The DDT era and thoughtless shooting caused its decline but just as man's hand had taken it away from us, his scientific efforts have returned it for all Pennsylvanians to protect and enjoy.

The Osprey has been a part of this planet's wildlife for 17 million years. They saw the great glaciers come and go and fished the icy veins which flowed from the massive ice flows. The Osprey have endured both geological and man made changes on this earth. With our help and support the Osprey may be able to survive with us as fellow space travelers on into the future. The birds can rear their young and provide a spectacular show of grace and beauty for our own children to see for future generations.

The entire record of the Osprey reintroduction effort in Pennsylvania is being documented in a 16mm color film "Return from Forever," by cinematographer Michael A. Fitch in cooperation with Commonwealth Media. This film is being eagerly awaited and should premier early in 1987. Several other states and a few European countries are anticipating future success with similar Osprey reintroduction attempts following Pennsylvania's model.

BLUE MOUNTAIN FRONTIER

By: Daniel Brauning

Over 200 years ago the Mason-Dixon line was drawn along the southern border of Pennsylvania to divide the south and north. This arbitrary division had great consequences on the state. Although birds don't follow political boundaries, they often do have distinct geographical boundaries.

Not far north of the Mason-Dixon line lies the Blue Mountain. The ridge, long known as an important hawk migratory route, also forms a major boundary between breeding ranges of southern and northern species. This impressive ridge enters Maryland west of Harrisburg and extends across southeastern Pennsylvania to the Delaware Water Gap. It separates the ridge and valley region from the atlantic coastal plain and in fact defines the southeastern border of nearly 20 species, such as the Black-throated Blue Warbler and Sharp- shinned Hawk. The investigation of such an ecological border is at the heart of the Pennsylvania Breeding Bird Atlas Project.

Steve Santner, a respected birder in the state, decided last summer to atlas Stony Valley. This extensive woodland tract is northeast of Harrisburg and lies just north of Blue Mountain. Steve found that many of Pennsylvania's northern species can be found here; including Black-throated Blue and Yellow-rumped Warblers. Four other species of warblers and a variety of other species including Dark-eyed Junco, Solitary Vireo and Purple Finch breed in Stony Valley, but not in central Lebanon County, only 10 miles to the south. The imposing Blue Mountain forms a real ecological border for these species. In the Furnace Hills, a comparable woodland in Lancaster County to the south, none of these species could be found despite careful searching.

To be sure, not all northern species' ranges are determined by Blue Mountain. Each species has its own set of ecological requirements that define its range. For example, the only area where Mourning Warblers are commonly found in Pennsylvania is on the Allegheny Plateau, in the northwestern corner of the state.

Although the Blue Mountain defines the southern border of a number of northern species ranges, the Susquehanna River bisects this ridge at Harrisburg. Here, a southern influence is evident all the way to the New York border, extending the limits of several species, like the Carolina Wren, to the north. In this area of central Pennsylvania, elevation plays a major role in defining what species are present: low elevation areas containing southern species; and the higher mountain areas supporting northern species.

One of the questions that comes from distribution studies like the Atlas Project is: What actually restricts species' ranges? Many geological factors north of Blue Mountain, including topography, soil types, and climate, differ from those to the south. Other, more subtle factors, may also play a part. Whatever the ultimate causes, the Breeding Bird Atlas Project is finding that the Blue Mountain represents one of the major ecological boundaries for the bird communities in the state.

Pennsylvania's Bobcat Status

by Jack M. Giles

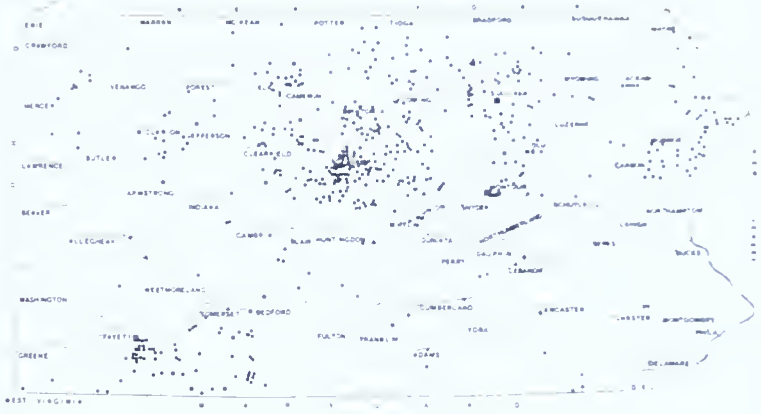
Wildlife Biologist

PA Game Commission

The bobcat is classified as a **vulnerable** species because of its possible low population density over its statewide range. (Genoways 1985) Just prior to 1970, circumstantial evidence strongly suggested that the population of bobcats in Pennsylvania was declining. No one knew what the population had declined from or to, but bobcats were not being seen nor captured as they had been in the past.

The Pennsylvania Game Commission protected the bobcat from hunting and trapping in 1970. It was hoped that this action would reverse the apparent population decline.

Figure 1. Locations of Reported Bobcat Sightings, Signs or other Evidence from the 1985 Survey



Since 1970, three inexpensive bobcat surveys have been conducted. Questionnaires were sent to District Game Protectors. This type of mail questionnaire is not expected to serve as a substitute for a more reliable population survey. Still, regardless of the accuracy of population estimates, observation of trends are possible. The number of bobcats reported in the state in 1970 were estimated at 520. The 1979 survey reported an estimated 704 bobcats, or a population trending upward. With the completion of the most recent (1985) survey it is estimated that the bobcat population has more than tripled (2,296 bobcats) in Pennsylvania's woods since the 1979 survey.

The population increase is attributed to its protection and its changing habitat. The bobcat has responded well to openings created by timber harvesting. These openings tend to increase small mammal populations that act as expanded food sources for bobcats and other predators. Normal timber harvesting and the increased salvage cutting from gypsy moth damage will result in more favorable conditions for the bobcat's habitat.

Optimum habitat provides an interspersion of woodlands with thick, brushy areas. Other good habitat mixes are open fields, swamps, weed grown areas and the terrain broken with steep rocky ledges and outcrops on mountain slopes. This kind of habitat provides food, escape cover, temporary shelter, and permanent den sites.

Through protection and habitat changes the bobcat seems to have benefited. Over the last decade the bobcat population has increased. Yet, the nocturnal habits and secretive behavior of the bobcat makes it a difficult species to study. Because of this, their ***vulnerable*** status remains somewhat in question. This bobcat study was reported in more detail in the September 1986 issue of the Game News. The last paragraph is an appropriate conclusion: Where we ultimately go in terms of bobcat research and management will be dictated by money and manpower—two commodities that are extremely limited at the present. But the bobcat will not be forgotten in Pennsylvania. Every year we are hearing more people say, "Guess what I saw the other day?—A BOBCAT!"

PLANT PROTECTION IN PEN

by Paul G. Wieg

Rare and endangered species have been a topic of considerable attention since the passage of the Federal Endangered Species Act in 1973. At that time, most of the concern focused on the plight of birds and mammals facing extinction. The majestic bald eagle became the symbol of the effort to assure that federal, state, and individual actions in the environment did not eliminate a species or its habitat.

Concern for the plight of rare species began with animals, but in 1975 some of the interest shifted to plants. At that time, the Smithsonian Institute prepared a list of plant species thought to be extinct, endangered or threatened in the United States. At the time, the plan was to review each of the plants and make determinations whether any should be officially designated by Congress as Endangered or Threatened. This was the standard endangered species method used by the U.S. Fish & Wildlife service, the federal agency responsible for endangered species protection.

However, the standard procedure didn't work because of the sheer volume of work which was required to process the hundreds of plants and lack of sound biological knowledge concerning the natural history of the species. Extensions were granted, and ultimately, the standard process was changed to make sure that plants that had been proposed, and legitimately required designation, were not pushed aside because of the volume of work.

Today, even with a more streamlined system, only 103 plants have been designated as Endangered, and 23 Threatened, by the federal government. This is in contrast to 220 Endangered and 60 Threatened animal species now on the list. At the federal level, the process to protect native plants has been slow.

Once a plant is listed, protection is far from assured. Listing as Endangered or Threatened means that the species occurrence is considered only if a project permitted or funded by the federal government puts the species in jeopardy. Otherwise a project under the control of many states, or a private concern, which might destroy a plant or its habitat, can proceed without regard to the rarity of the species.

Part of the problem of plant protection lies in our system of laws. In general, animals belong to the federal government. The robin that nests in your front yard is not yours, or your responsibility. By law you can't kill the bird without penalty under federal guidelines which are passed on to state government. In Pennsylvania, the Pennsylvania Game Commission is charged with the responsibility to protect migratory birds and all mammals.

In the case of Endangered birds or mammals, an extra level of protection is provided with fines for killing or disturbing the species as well as altering its habitat. This is the case in Pennsylvania for several species including the bald eagle, kirtland's warbler, and others. For cold-blooded vertebrates- fish, reptiles, and amphibians- the Pennsylvania Fish Commission has been given the responsibility by the federal government and has jurisdiction in the Commonwealth.

Plants are quite different. Where animals are "owned" by the government, plants belong to the owner of the property on which they grow. You can't disturb the robin in your apple tree, or the bald eagle in Conneaut Marsh, but you can do what you wish even with a Federally Endangered plant as long as your project isn't licensed or funded by the federal government.

Native plant protection in Pennsylvania began officially in 1983 with the passage of the Wild Resource Conservation Act. Known for the formation of the "checkoff" on state income tax forms, this act is also the basis for native plant protection in the Commonwealth. The act is the first legislation in Pennsylvania that specifically provides for the listing of Endangered, Threatened, and other categories of plants, the protection of listed species, and management of native plants. The act provides penalties for destruction of special concern plants, and plant habitats. However, the penalties apply only to those instances where one person destroys plants on the property of another.

Just as with the federal laws, the plant belongs to the private owner of the property; state laws cannot restrict the actions of the private owner of the property.

In the face of these realities however, something is being done and the future is even brighter. The single most positive aspect of native plant protection in Pennsylvania is on public lands. To protect a native plant, you must own it, and we as citizens of Pennsylvania own several million acres of forest, lakes, waterways, abandoned fields, wetlands, river islands, and mountaintops across the Commonwealth.

The PA Department of Environmental Resources owns over two million acres of state forest, and 281,000 acres of land in 113 state parks. The Game Commission holds and manages 1.2 million acres in game lands across the Commonwealth. In addition, there are 510,000 acres in Allegheny National Forest, and private conservation organizations own and manage numerous natural areas for protection of plants, animals and communities.

NSYLVANIA – IT'S WORKING!

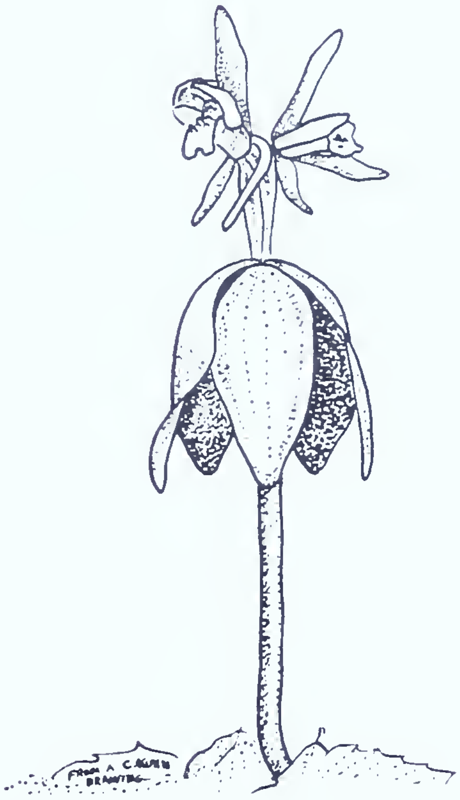
man – PNDI - West

On these public lands the opportunity exists to protect many plants. In fact, several interesting and important activities have already taken place. A notable example took place this past spring.

The Pennsylvania Game Commission is noted for the outstanding work it has done managing native wildlife. Their concern for the protection of all aspects of the natural environment was demonstrated this year when a stand of Endangered plants was found growing on one of their game lands. The plants were in an area slated to be logged, and in fact, a haul road would have destroyed the population. Once the Game Commission's Division of Forestry was alerted to the situation, they immediately contacted a botanist to check on the veracity of the report. Meeting with Commission personnel at the site, the plants were found, and immediately plans were made to adjust the logging activity and avoid destruction of the plants and their habitat. Further searches were made to make sure no additional colonies were growing in the immediate region and finally an area was designated to protect the species.

The new special management zone was determined and recorded at both the Harrisburg and regional offices of the Game Commission. The boundaries were noted on the overall management plans, and presently any activity within that area is carefully monitored and knowledgeable individuals are contacted if problems arise. The total time from location of the plants in the field to the designation of the area as a protected site by the Game Commision was ***just over one week!***

Other agencies in Pennsylvania are taking similar actions to protect rare native species on their property. The Bureau of Forestry is actively reviewing special concern plants which are found on State Forest land, and taking action to protect them through designation of special management areas. Presently there are 45 State Forest Natural Areas totalling over 50,000 acres. One area in particular is the Goat Hill Natural Area in Chester County. The tract, containing several special concern plants, was purchased by the Nature Conservancy and transferred to the Bureau of Forestry for plant and habitat protection. This is the first Bureau of Forestry land specifically purchased as a Natural Area.



The Pennsylvania Bureau of State Parks staff is now writing management plans for each of its holdings. A part of the management plan addresses native special concern species, and portions of parks are being set aside for protection. This is an especially important action considering that many state parks were formed around prized natural features, and many of these natural features contain special concern plants. Presque Isle State Park in Erie County, a natural sandspit peninsula curving out into Lake Erie, is one of the most unusual habitats in the state. The uniqueness of the habitat is underscored by the fact that over 60 species of special concern listed plants have been known to occur on the moist sand flats and dunes and in the wetlands of Presque Isle.

Finally, private land conservation organizations have taken the initiative to protect native species by buying the property on which they grow. The Western Pennsylvania Conservancy has acquired such critical botanical areas as Ferncliff Peninsula, Ohiopyle, PA., now a part of Ohiopyle State Park. Some tracts containing special concern plants are small and fragile. They are unable to stand up to the pressure of public ownership and thus are held by the private organizations for special protection. An example of these are Fringed Gentian Fen in Lawrence County, the only known location of ***Eleocharis rostellata*** in the state. Tannersville Bog, one of the finest and most southern examples of a glacial wetland in eastern Pennsylvania is owned and managed by The Nature Conservancy, Eastern Pennsylvania Chapter.

These are all examples of the protection of special concern plants that is taking place in Pennsylvania. Although a relatively new concern, and one that is hampered by the legal view that plants are private property, the future is bright in Pennsylvania both on public lands and through private initiative.

The Phantom of Fiddler Creek

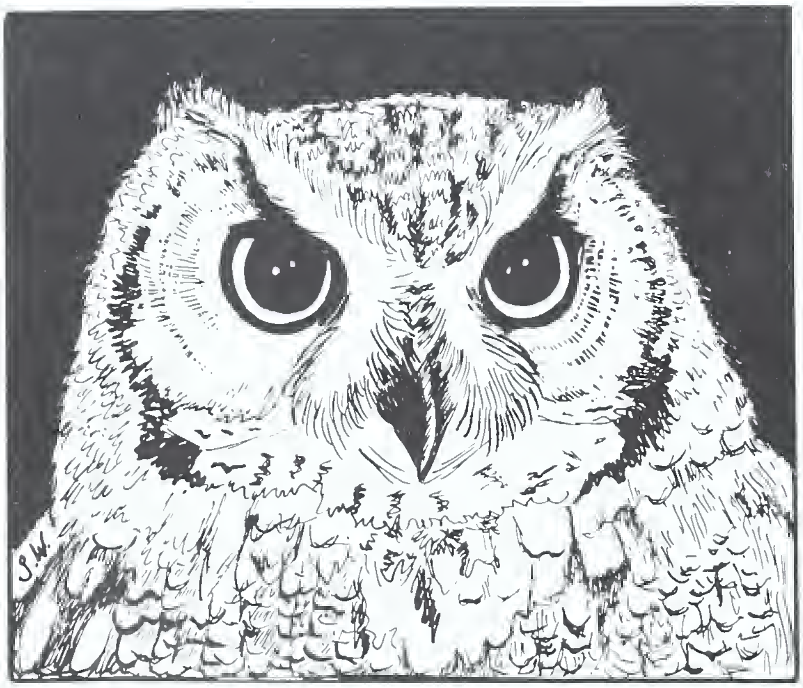
By: Sal & Bernadette Pitera

What happens when Ben and Lori venture into the woodlands and along the waterways of Pennsylvania?

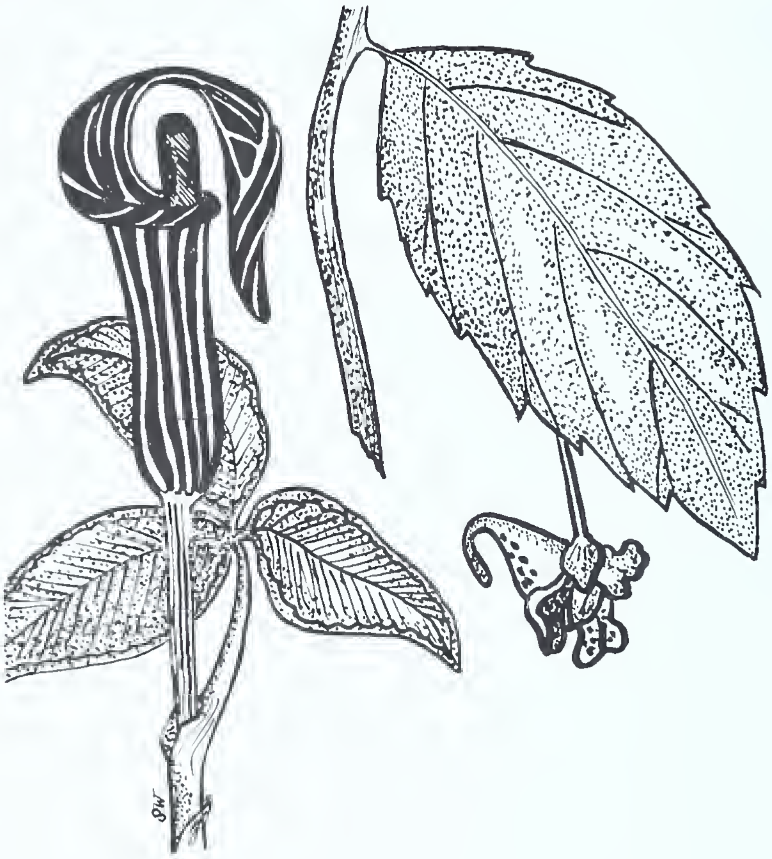
Ben and Lori are the fictitious characters of an elementary-level activity book, about to be distributed by the Pennsylvania Game Commission, Fish Commission and Bureau of Forestry. Entitled "The Phantom of Fiddler Creek," the 40 page book has been funded by the Wild Resource Conservation Fund, and will be introduced for classroom use in time for Environmental Education Week in October.

Picture a typical family headed for a stay at their cabin. The initial surprise at the cluttered condition of this cabin and the innuendos as to the legends behind area names begin a suspense that escalates during the course of the story. Right down to its unusual and humorous conclusion, the book presents a believable family and exciting set of circumstances for the young reader.

And, along the way, children (as well as parents and teachers) will become acquainted with Pennsyvania's wild resources. In the course of preparing for her college work as an art student, daughter "Lori" depicts kestrel, praying mantis and screech owl. Through her "field notes," we learn that the kestrel is the smallest member of the falcon family. The screech owl has "ear" tufts which are actually feathers and the foam-like egg case of the mantis is called an "ootheca."



Mom, Dad, Ben and Lori head for the lake, where they speak with Waterways Conservation Officer Ken Brown. Boating safety becomes an item of discussion and the book's artwork brings to life the mallard, Canada goose, great blue heron and green frog.



On the hiking trails of the area, the family learns the importance of being properly prepared with compass, clothing and common sense, through the misadventures of a trio of lost teenagers they encounter. Upon arriving at Gramps' log cabin, Ben enjoys the stories that are part of our state's history, and Gramps' character is a fitting tribute to a rustic and natural way of life which is rapidly being relegated to the display areas of our local museums. By relating on a child's level, the past becomes real and the world of nature gives fascinating insight into our precious resources.

"The Phantom of Fiddler Creek" is a storybook, a coloring book and a storehouse of outdoor knowledge. It is also an activity book—a fact most children will find irresistible. A young reader will learn that snakes are useful and which characteristics identify the poisonous ones. Common lures are matched with fish species. Hidden words represent a list of wild edibles that Ben's family is fond of. A crossword puzzle sheds much information on wildflowers and plants. Ben's plant photography discusses the unusual characteristics of such species as dogwood, jack-in-the-pulpit, teasel, milkweed, jewelweed and staghorn sumac.

The value of trees to mankind is illustrated with leaf silhouettes and a word scramble of their uses. A maze takes us through the obstacles of a hike and a "find the hidden pictures" page gives a good idea of the equipment that is an integral part of the outdoor experience. Songbirds, mammals and state symbols are all represented.

The books will be available through agency personnel. A teacher's manual has also been prepared which presents units of information suitable for joint or single presentation of environmental learning. For example, the spotting of an osprey in the storyline lends itself to discussion of the Bald Eagle Recovery Project within the state. Work to date, anticipated future approach and possible outcome are considered in this important focus on endangered wildlife.

Many plant species are considered threatened for lack of the habitat upon which their existence depends. Natural Areas are being created on both private and public lands, and study in this subject is escalating. The booklet, "Endangered and Threatened Species of Pennsylvania," published jointly by the Fish and Game Commissions, is the reference for the "Pennsylvania Endangered Crossword Puzzle."

Health and outdoor safety are covered through situations which appear in the storyline. The importance of Personal Flotation Devices is explored. Snakes are discussed. The massasauga, timber rattler and copperhead are the only poisonous snakes among the 21 species found in the state. Rare in most cases, the habitat of each is explored and look-a-like species described. Through the object lesson of the storyline, Ben's family treats the sighting of the snake with common sense, knowing that it will escape at the first opportunity.

Eating wild edibles is a hazardous preoccupation for the uninitiated.

Again, a common sense approach is explored. Getting lost is a frightening possibility when exploring Penn's Woods. Dealing with panic is usually the first step in coping with this situation; and a comprehensive lesson lays out the guidelines toward enjoying the outdoors while staying safely within the limits of one's knowledge and capabilities.

For the inquisitive child and for the creative teacher, the activity book and teacher's manual are excellent tools. In the long run, it is our children who are the most valuable resource—they need to become aware of the natural world with which they are surrounded.

For a free copy and information about how to get classroom quantities,contact: Dan Devlin, DER Bureau of Forestry, P.O. Box 1467, Harrisburg, PA 17120; Steve Ulsh, Pennsylvania Fish Commission, P.O. Box 1673, Harrisburg, PA 17105-1673; or Carl Graybill, Pennsylvania Game Commission, Box 1567, Harrisburg, PA 17105-1567.

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PA Outdoor Writers Association
PA Recreation and Park Society, Inc.
PA Wildlife Federation
Sierra Club PA Chapter
The Nature Conservancy
Western Pennsylvania Conservancy
Wildlife Society PA Chapter

ANNUAL MEETING

The Wild Resource Conservation Board will hold its annual meeting on Thursday, November 20, 1986, 1:00 p.m. at the Pennsylvania Game Commission Office, 8000 Derry Street, Harrisburg, Pennsylvania. A full report will be presented on the allocation of monies from the Wild Resource Conservation Fund and a formal funding plan will be adopted. The Board will consider all presentations made at the public hearing and the management plans outlined by the professional and technical staffs of the Pennsylvania Fish Commission, Pennsylvania Game Commission and Department of Environmental Resources.

The recommendations funded by the Board will be administered by the Pennsylvania Fish Commission, the Pennsylvania Game Commission and the Department of Environmental Resources. The recommendation selections will be based on their individual contribution to the management goals of the three agencies and those outlined in the Wild Resource Conservation Act.

DO SOMETHING
WILD

Wild Resource Conservation Fund
P.O. Box 1467
Room A1-85, 3rd & Reily Streets
Harrisburg, PA 17120

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Winter, 1987
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JUN 16 1987

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P.O. Box 1467 Harrisburg, PA 17120

DO SOMETHING *WILD*

KEYSTONE WILD NOTES

A COOPERATIVE PROGRAM OF THE PA. GAME COMMISION, PA. FISH COMMISSION, PA. DEPARTMENT OF ENVIRONMENTAL RESOURCES AND DIRECT CONTRIBUTORS TO THE WILD RESOURCE CONSERVATION FUND

Volume III Number 2 Executive Director/Editor Frank Felbaum **WINTER 1987**

PENNSYLVANIA NATURAL DIVERSITY INVENTORY

HOW MUCH IS ENOUGH?

By - Tom Smith
PNDI-East

The 1986 field season for the Pennsylvania Natural Diversity Inventory staff, its numerous contract workers and volunteers is far from over. We will be afield searching Pennsylvania's forests, wetlands, and barrens for rare, threatened, and endangered plant and animal species, and exemplary natural communities through the winter months.

The majority of our field work is focused upon attempting to relocate sites where the species of special concern were historically reported. This historic information has been gathered from plant and animal collections maintained at Pennsylvania's universities and natural history museums. It is much more cost efficient to attempt relocation of a species from where it was reported historically, than to randomly search for it on the landscape. Once we do search out the known historic locations and have a clear picture of the habitat each species requires we can then begin searching for it at additional sites in the state.

This brings us to two frequently asked questions. When searching a particular site for a rare species how much searching do you do, and if you do not find what you are looking for when can you make the decision that the species has been lost from the site? The intensity of a field survey, i.e., the amount of time spent, is dependdent on the priority rank of the species or community for which we are searching. The priority rank is based upon how rare the species is both in Pennsylvania and over its entire range, how sensitive it is to disturbance, i.e., how likely it is to remain at a given location for a long period of time, how many populations are currently being protected in Pennsylvania, and several other factors. Thus more intensive surveys are generally conducted for those species and communities which are unprotected, or those high ranking ones which are underprotected in the state.

Polemonium vanbruntiae

Making the determination as to whether a species is no longer at a given site, or whether you simply did not find it can be much more difficult. If the habitat is completely destroyed and you are sure you are at the right location the answer is easy enough. Fortunately in the majority of cases suitable habitat appears to be present, but directions may be vague, and there may exist a vast area of undisturbed land containing a small plot of the specific habitat required by the species you are seeking. In these cases it could take alot of searching to locate the element being sought. Thus the higher priority the element the more searching we do, and if the element is not found but the habitat is intact it is

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simply impossible to make the determination that the species is no longer there. If it is a plant it may well be there but in the seed stage awaiting the proper conditions for germination, or as with some animals they can be very inconspicuous and easily overlooked.

Poa paludigena

Field work carried out by the PNDI this summer clearly demonstrated how important it is to make repeated surveys of potentially viable historic sites if the species sought is not found on the first visit. Bog bluegrass (Poa paludigena) is a small perennial grass found in spring-fed swamps in Indiana, Iowa, Michigan, Minnesota, and Pennsylvania. It is known to be extant at only thirteen sites in the world, is considered endangered in Pennsylvania, and is being proposed for federal listing. All Pennsylvania historic sites for this plant were surveyed in 1982-1984 by professional botanists, and it was found at three of the fifteen historic locations. In June of this year I resurveyed the viable historic locations, several of the historic sites were completely destroyed, and found one additional population. This now brings the known number of populations in Pennsylvania to four, and the known world total to thirteen.

Slender rock-brake (Cryptogramma stelleri) is a fern found on cool, moist, shaded, calcareous (sweet) rocks and ledges. It has a circumboreal distribution, but is considered rare in many areas, including all of New England, and considered endangered here in Pennsylvania. Our four historic locations had all been sought in previous years and we were successful in finding the plant at two sites. Additional survey work this year for one site which had vague locational data resulted in its relocation this summer. There are now three known extant population of slender rock-brake in Pennsylvania.

Jacobs' ladder (Polemonium vanbruntiae) is a wetland herb preferring circumneutral to acidic seepage swamps, thickets, and marshes. It is known to be extant at 33 sites ranging from Vermont to West Virginia, and until this year had not been reported in Pennsylvania for over twenty-five years, dispite repeated intensive surveys in recent years. However, in 1986 our persistence paid off and a small population was found by the Morris Arboretum Botanists in northern Wayne County.

These are but three examples of three hundred plus field surveys carried out by PNDI biologists this summer, and the more than two hundred rare plant, animal, and exemplary natural community sites found by PNDI biologists supported by the Wild Resource Conservation Fund. Intensive surveys for these species have provided us with good, up-to-date documentation that much of their habitat has been destroyed, and enables us to better assess their true status in Pennsylvania. In addition to confirming the status of these species we have gained a fuller understanding of their habitat, so that sound conservation plans can be made to assure their proper management and preservation.

Your contributions to the Wild Resource Conservation Fund are helping to support the continuous, systematic collection, management, and use of information on Pennsylvania's ecological features, and thus helping to assure the preservation of the Commonwealth's natural heritage.

WILD RESOURCES CONFERENCE

Block off June 12-14 of 1987 on your calendar now—this weekend is the Wild Resources Conference and will be held at the Keller Conference Center in State College. The conference will be conducted by the 3 agency coordinators from the PA Game Commission, PA Fish Commission and the Department of Environmental Resource, Bureau of Forestry and facilitated by PA State Parks.

The weekend is designed to run 2 days for educators and general public. Concurrent workshops, seminars, field trips and hands-on activities will highlight this event.

The majority of the activities scheduled for this weekend revolve around projects funded by the Wild Resource Conservation Fund. The weekend is to give the participants a better understanding on how Pennsylvania's Wild Resource Conservation Fund functions with voluntary contributions from the state tax payers.

Limited space will be available and will be filled on a first-come first-served basis. For further information on registration, room and board contact the Wild Resource Conservation Fund, Box 1467C, Harrisburg, PA 17120.

METROPOLITAN EDISON BACKS OSPREY FILM PRODUCTION

Met-Ed is playing a major role in "Return From Forever", a film about the Pennsylvania Osprey Reintroduction Program, to be seen by audiences across the U.S. and around the world. The company has contributed $20,000 to the Wild Resource Conservation Fund, the film's developer, and will be listed in the credits as a major sponsor.

In announcing the grant, Met-Ed President Fred D. Hafer noted, "We believe that, indirectly our contribution will support all the other meritorious projects of the Wild Resource Conservation Fund. We will be proud to have this grant serve as a catalyst for contributions from other companies and foundations." Aside from contributions such as this sponsorship by Met-Ed, the Fund receives a large portion of its budget from Pennsylvania taxpayers who use the tax refund checkoff program.

"Return From Forever" features a pair of osprey at Portland Station and their history-making chick, the first native born osprey in Pennsylvania in over 30 years. The cast of supporting human players includes some Met-Ed employees.

The osprey program, in which Met-Ed has been participating since 1982, yielded its much hoped-for results in 1986. About 20 osprey that were translocated from the Chesapeake Bay and raised in northeast Pennsylvania by researchers, returned to the Pennsylvania location after their migration to South America. Six of them built nests and four chicks were hatched.

The history-making program was conducted under the direction of Dr. Larry M. Rymon of East Stroudsburg University. It is being recognized by international raptor organizations as a "model" for similar projects in other locations where the majestic osprey, or "fish hawk" has disappeared.

"Return From Forever" is being produced by Michael A. Fitch, Cinematographer, which shot 7 miles of film during the summer of 1986. It is being produced and edited in conjunction with Commonwealth Media Services.

The 27-minute film will show the Pennsylvania Osprey Reintroduction Program. It is expected to appear this spring on all Pennsylvania Public Broadcasting Stations. In March, it will be entered in an international raptor film competition in Israel.

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1987
POSTER AVAILABLE

For a $2.00 contribution to cover postage and handling, you will receive a full color (17" x 22") Wetlands poster and a copy of "Keystone Wild Notes". "Wild Notes" is the newsletter of the "Fund", this will insure your name to be placed on the mailing list of the "Fund". A limited supply of the Saw-whet owl are still available. Start your collection now.

Please send all correspondence concerning the poster and "Keystone Wild Notes" to:

Wild Resource Conservation Fund
P.O. Box 1467
Room A1-85 Evan Press Building
Third & Reily Streets
Harrisburg, PA 17120

Federal Nongame Act

President Reagan has signed legislation reauthorizing the Fish and Wildlife Act of 1980, commonly known as the Nongame Act. The House passed a reauthorization bill last year, but that measure had been stalled in the Senate until recently, according to the Wildlife Management Institute.

The Nongame Act is designed to provide matching funds to state wildlife agencies for managing wildlife that is not hunted or trapped. However, Congress has not appropriated funds to activate the program even though 46 states have set up nongame programs in order to participate.

The House hearings in 1985 included discussions of ways to fund the nongame program. Potential sources mentioned included excise taxes, a federal income tax checkoff and a special postage stamp. However, the Senate could not muster enough interest in the Nongame Act this year and approved the House-passed measure (H.R. 1406) without hearings. A spokesman for the Senate Environment Committee said that the panel decided to go with a simple reauthorization now and will deal with funding sources when the authorization expires in 1988.

Outdoor News Bulletin
Wildlife Management Institute
August 1, 1986, Vol. 40 No. 15

RECORD AMOUNT ALLOCATED FOR 1986 PROJECTS

Pennsylvania's Wild Resource Conservation Board approved $367,162.00 funding from 1986 contributions for 28 projects to protect and manage the Commonwealth's nongame and wild plant species. The approved projects include:

- * $10,500—Support for Osprey monitoring returns and documentation of nesting behavior in the Commonwealth.
- * $10,000—Field Studies on Eastern Pennsylvania Plants of special concern to Morris Arboretum for input into the Pennsylvania Natural Diversity Inventory.
- * $5,000—Field survey the populations and habitats of the Eastern Woodrat in Western Pennsylvania.
- * $2,500—Raptor identification workshop for Deputy Game Protectors.
- * $8,000—Extraction of useful data from organized snake hunts; this will better help to protect and manage the Commonwealth's existing Timber Rattlesnakes.
- * $6,000—Inventory and computerize the mosses of Pennsylvania.
- * $66,767—To fund DER's Wild Plant Management Program. The Department, within the Bureau of Forestry is establishing a classification system designed to help protect special plant populations. A centralized computer database containing information on all of the Pennsylvania's plants of special concern will be maintained by the Department. This is a statutory administrative mandated expense under Act 1982-170.
- * $20,000—"Wild Resource Conservation Fund Activity Storybook" will be developed to increase the public awareness about wild resources within the Commonwealth. This book will be used throughout the state school system network.
- * $9,000—This survey is on-going and will help monitor 32 species for use in updating the computerized inventory system for small mammal research and management.
- * $26,745—The study intends to focus on the drainages of Eastern Pennsylvania River Systems to survey the status and population of Nongame Fishes.
- * $45,000—Western Pennsylvania Conservancy to continue its database and field survey work on the Pennsylvania Natural Diversity Inventory.
- * $20,000—Status survey of Endangered and Threatened Amphibians and Reptiles. A pressing need exists for surveys of the present occurrence and population of each species.
- * $45,000—The Nature Conservancy to continue its database and field survey work on the Pennsylvania Natural Diversity Inventory.
- * $12,000—Pennsylvania River Otter reintroduction program.
- * $35,000—Pennsylvania Breeding Bird Atlas, the data gathered will provide a sound foundation for environmental planning at all levels of government. This study locates the breeding habits of birds across the Commonwealth.
- * $10,000—DER mini-grants for education and public awareness on wild native plants.
- * $5,000—Pennsylvania Wild Resources Conference, opened to the general public and educators at State College, June 12-14, 1987 conducted by the 3 agency coordinators and facilitated by PA State Parks.
- * $5,000—"Woodworking for Wildlife", woodworking craft book to be distributed to the wood shops of secondary and vocational technical schools.
- * $3,500—Wildlife food and cover nature trails at the Northeast Regional Office of the Pennsylvania Game Commission.
- * $750—10 copies of slide-tape program—"Bats, Myth and Reality".
- * $5,000—Nongame and Endangered Species Law Enforcement Today and Tomorrow workshop for field officers of the Pennsylvania Game Commission.
- * $1,500—Nongame and Endangered Species workshop for Environmental Education Teachers.
- * $2,800—Computerized data file for PA Game Commission Hibernacula reports.
- * $3,000—Computerized data file for PA Game Commission Colonial Bird Register.
- * $3,900—Computerized data file for PA Game Commission small mammal survey records.
- * $1,500—Endangered and Threatened Botanical Survey of Snyder and Union Counties.
- * $2,500—Workshop on Falconry Methods, Equipment and Regulation.
- * $1,200—Backyard habitat display at the Southwest Region Office of PA Game Commission

**$50,000 has been allocated to the 16mm Osprey Documentary film. (This is to be reimbursed by foundation monies at a later date).

1987 Wild Plant Mini-Grant Program

Trollius laxus

The Wild Resource Conservation Board again supported the Wild Plant Mini-Grant Program by allocating $10,000 to the Department of Environmental Resources to conduct native plant projects. The grant objectives are slightly different this year with emphasis on scientific research proposals. The objectives listed below will be used to choose which proposals will best assist the native wild plant management program. Application packages were sent to over 150 individuals and organizations across Pennsylvania.

1. Create interest in native wild plant protection with emphasis on educational aspects of rare plant conservation.
2. Design and execute rare plant monitoring projects at sites which support Plants Of Special Concern In Pennsylvania (POSCIP).
3. Conduct inventories to locate historically known and previously undocumented locations of POSCIP species and/or conduct research related to taxonomy and ecology of POSCIP species in cooperation with the Pennsylvania Natural Diversity Inventory (PNDI) project.

Groups Supporting Wild Resource Conservation Fund

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Citizens Advisory Council
Garden Club Federation of PA
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Sierra Club PA Chapter
The Nature Conservancy
Western Pennsylvania Conservancy
Wildlife Society PA Chapter

Habitat Hint

The Best of Bird Feeders and Bird Foods

by Craig Tufts

"Is there 'one perfect birdfeeder?' "

"What kind of food is best?"

These are questions I'm often asked, and I am glad to have the extensive research of Dr. Al Geis, Urban Wildlife Biologist for the U.S. Fish and Wildlife Service, to back up and expand upon my own observations and experience in feeding birds.

Of course there is no "perfect" feeder or over-all best food for all birds, but I think we can come pretty close to the ideal. A tubular, plastic feeder stocked with sunflower seeds is highly successful. You'll find fewer squirrels at this feeder than at others, particularly if the feeding "ports" are lined with metal and if you place it at a distance from overhanging eaves and branches. You can pick and choose your perch sizes to suit the kinds of birds you have—or want to have—at you feeder. Long perches accommodate large birds. Small birds need short perches—or no perches at all.

Different birds like different foods, of course, but if there is one "general" food favorite, it is sunflower seed.

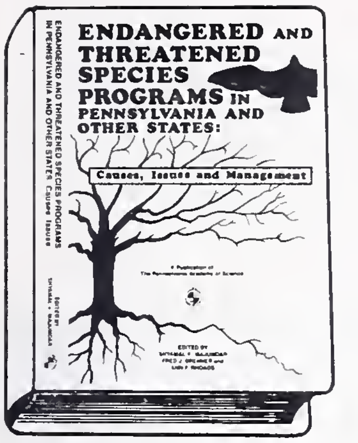
Sunflower seed (striped or black oil varieties; hulled or in the shell) will attract cardinals, goldfinches, purple finches, grosbeaks and a variety of other colorful, seed-eating birds. Also, birds such as chickadees, titmice, woodpeckers and nuthatches, all of which depend heavily on overwintering insects (adults and larvae) and spiders, will frequent a sunflower seed feeder.

Black oil sunflower seed, with the highest calorie count per gram of kernel, is a fine source of energy, a real necessity for birds when the weather is windy and cold. This seed is probably a good food substitute for the insect eaters, especially in certain urban areas where their natural diet may be limited.

You can buy your sunflower seed pre-packaged or loose. Bagged seed (striped or black oil varieties) can be found in most supermarkets, hardware stores and agricultural co-ops. It's less expensive to buy 25 to 100-pound bags. An even better buy is loose seed that you bag yourself. That way you get to choose striped or black oil seed. More importantly, you get to make sure the seed is clean, not infiltrated with stems or insect-riddled. Clean, black oil sunflower seed is your best buy.

Hulled sunflower seed costs more than unhulled seed, but it's a no-waste food that both saves your plantings from being smothered in hulls and yourself from having to clean hulls off the ground. As for the birds, hulled sunflower seed means less work in getting at the snack that you have provided for them.

NWF-The Backyard Naturalist


ENDANGERED AND THREATENED SPECIES PROGRAMS IN PENNSYLVANIA AND OTHER STATES:
Causes, Issues and Management

ENDANGERED AND THREATENED SPECIES PROGRAMS IN PENNSYLVANIA AND OTHER STATES: CAUSES, ISSUES AND MANAGEMENT

Edited by S.K. Majumdar, Ph.D., Lafayette College, PA
Fred J. Brenner, Ph.D., Grove City College, PA
Ann F. Rhoads, Ph.D., University of Pennsylvania, PA

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WILD RESOURCE CONSERVATION BOARD
Elects Chairman

At the annual meeting of the Wild Resource Conservation Board (WRCB) Senator Raphael (Ray) Musto, Minority Chairman of Senate Environmental Resources Committee was elected chairman. Act 1982-170 requires the chairmanship of the Wild Resource Conservation Board to rotate on an annual basis among the members

The chairman is responsible for calling meetings of the Wild Resource Conservation Board and presiding over said meetings. The chairman has been delegated by the Wild Resource Conservation Board to be direct liaison between the Wild Resource Conservation Fund Executive Director's Office.

Other members of the Wild Resource Conservation Board are Arthur A. Davis, Acting Secretary of the Department of Environmental Resources, Ralph W. Abele, the Executive Director of the Pennsylvania Fish Commission, Peter S. Duncan, the Executive Director of the Pennsylvania Game Commission, Representative George S. Hasay, Minority Chairman of House Conservation Committee, Representative Camille "Bud" George, Majority Chairman of the House Conservation Committee, Senator D. Michael Fisher, Majority Chairman of Senate Environmental Resources Committee.

The Wild Resource Conservation Board administers the voluntary tax check-off contributions from the citizens of the Commonwealth. The tax check-off is a way for all interested individuals to support the protection and management of our wild resources.

Photo Credit: PA Game Commission
Chairman Peter S. Duncan, (Left) Executive Director of the PA Game Commission turns the chairmanship responsibility over to newly elected chairman of the Wild Resource Conservation Board, Senator Raphael Musto, (Right) Minority Chairman of Senate Environmental Resources Committee.

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DO SOMETHING *WILD*

KEYSTONE WILD NOTES

A COOPERATIVE PROGRAM OF THE PA. GAME COMMISSION, PA. FISH COMMISSION, PA. DEPARTMENT OF ENVIRONMENTAL RESOURCES AND DIRECT CONTRIBUTORS TO THE WILD RESOURCE CONSERVATION FUND

FALL 1989

VOLUNTEERS FOR WILDLIFE

FIRST BAT TREND SURVEY

Written by Jerry D. Hassinger
Edited by Daniel A. Brosky

When 11 projects were chosen to launch Pennsylvania's pioneer "Volunteers for Wildlife" project, no one guessed a bat trend survey would be the second most popular project. By May 21, 1988, 590 people expressed interest in conducting such a survey. These potential participants were sent detailed instructions and survey forms to complete.

Seventy eight surveys were completed. Additional survey attempts failed to find a survey site with bats.

Seventy two volunteers (and assistants) and six Game Commission Wildlife Technicians completed one of the nation's first summer bat trend surveys. Data from 78 survey sites in 33 counties was highly variable due mainly to weather (especially temperature and wind), habitat around the survey site, and probably other unmeasured variables, such as insect activity. Observers tallied 8,239 bat passes (average: 103 passes per surveyor; range 0 to 684 passes per survey site). High temperature (>70°), low wind (<7 MPH) and large amounts (average 58%) of forestland around survey sites were positively associated with highest bat activity. The five sites with the most bat activity were located in eastern Pennsylvania. Yet, according to Dunn and Hall (1989, in press), most (88%) major winter populations of the little brown bat (Pennsylvania's most common bat) are found in western Pennsylvania. Such variance - noted for the first time - allows us to begin asking questions about summer bat populations in Pennsylvania. Asking the right questions is one of the first steps in finding and conserving summer bat concentrations and their habitat.

Survey results support the fact that counts of bat passes are affected by many variables and are more indicative of activity rather than actual numbers of bats. More emphasis will be placed on counting bats. Bat numbers (a bat trend survey) will be made at feeding, drinking and other sites to count bat numbers at fixed locations over several years. This will develop regional indices of bat abundance and trends.

(Continued Next Page)

STATE LIBRARY OF PENNSYLVANIA
DOCUMENTS SECTION

Counts of bat passes will be continued, but mainly at feeding and drinking sites. The objective of counting bat passes will be to find and describe sites (and habitats) of most value to bats in summer.

Despite the observed variability, 1988 was an important year. For the first time ever, we have baseline data on bat activity over a broad area. Even these first year results pose some interesting questions.

1) Per unit effort, most bat activity was observed in eastern Pennsylvania in that 11 of 50 survey sites (22%) had more than 100 bat passes tallied in one night. In western Pennsylvania, only 4 of 28 surveys (14%) tallied more than 100 bats in a night. Is this difference real or the product of too limited a sample? Could it be real, considering that according to Dunn and Hall only 12 percent (2 of 17) of the known major winter populations of the little brown bat (the most common bat in Pennsylvania) are found in eastern Pennsylvania.

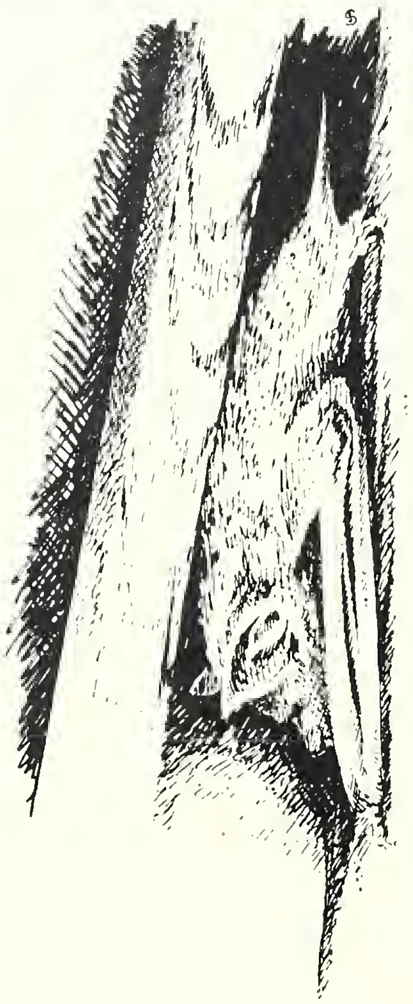
2) Schuylkill County had 2 of the 3 highest tallies of bat passes in a single night. Yet no large, winter concentrations of little brown bats (or other species) are known from Schuylkill County or any of its neighboring counties. Where are these bats over-wintering?

3) About 50 percent of all surveyors checked the category "0" (3 sites), or "1" to "5" category (38 sites) when estimating the highest number of bats seen. What will this figure look like in the year 2000? Will 80 surveyors tally 8,239 bat passes (average = 103 passes per surveyor) in the year 2000? Or will the figure in the year 2000 be substantially different? What would the tally have been in 1940? This last question is easy to answer. We'll never know.

4) Highest bat activity (over 100 passes per night) was negatively associated with cultural habitat, proportional to the amount of openland around survey sites, and positively associated with forestland. Will these "apparent" associations withstand the test of larger samples and time?

5) What specific habitats or locations are most valuable for feeding bats in summer? With the help of volunteers, we've started the process of finding these sites. If, for example, some sites consistently (3 of 4 survey years) exhibit high bat activity, further studies of these sites may be warranted. Currently, very little is known about "best summer habitats" for bat species in Pennsylvania. Finding "best" summer habitat is the first step in protecting it.

Weather, habitat location and the differing capabilities of volunteers all combined to introduce variability into survey results. Temperature (one of many weather variables) alone can drastically affect bat activity. Changes in this year's (1989) survey instructions are trying to minimize the temperature variability where possible. Otherwise it will be difficult to detect real declines (if any) in region-specific bat activity. Other important ways to reduce the affects of such variability is to survey bats at a large number of sites (= more volunteers) and to combine data from sets (3-year or 5-year) of successive years (= more time).



A BAT LIKE THAT

BEHOLD THE BAT

Bats are ugly, ugly, ugly,
Grotesque little faces,
Warty snouts,
Tiny teeth in alien mouths.
Friends of witches, friends of trolls,
Wrinkled parchment wings unfold,
Stretched-out finger bones and skin,
So very, very, batlike thin.
Darkness makes bats come alive,
Hairy bodies, piercing eyes.
Darting, swooping, diving demons,
Of caves and graves and hidden dens,
Moonlight madness, high-pitched beeps,
Bats give human beings the creeps.

BAT WATCHING

Some people are horse fans,
Others love cats,
And some like snakes and their kin.
But I love bats,
With their furry snouts,
And stretched-out wings of skin.

Can you imagine
How hard it would be
To catch hundreds of darting flies,
Or nab tiny moths
On the wing in the dark
Without ever using your eyes?

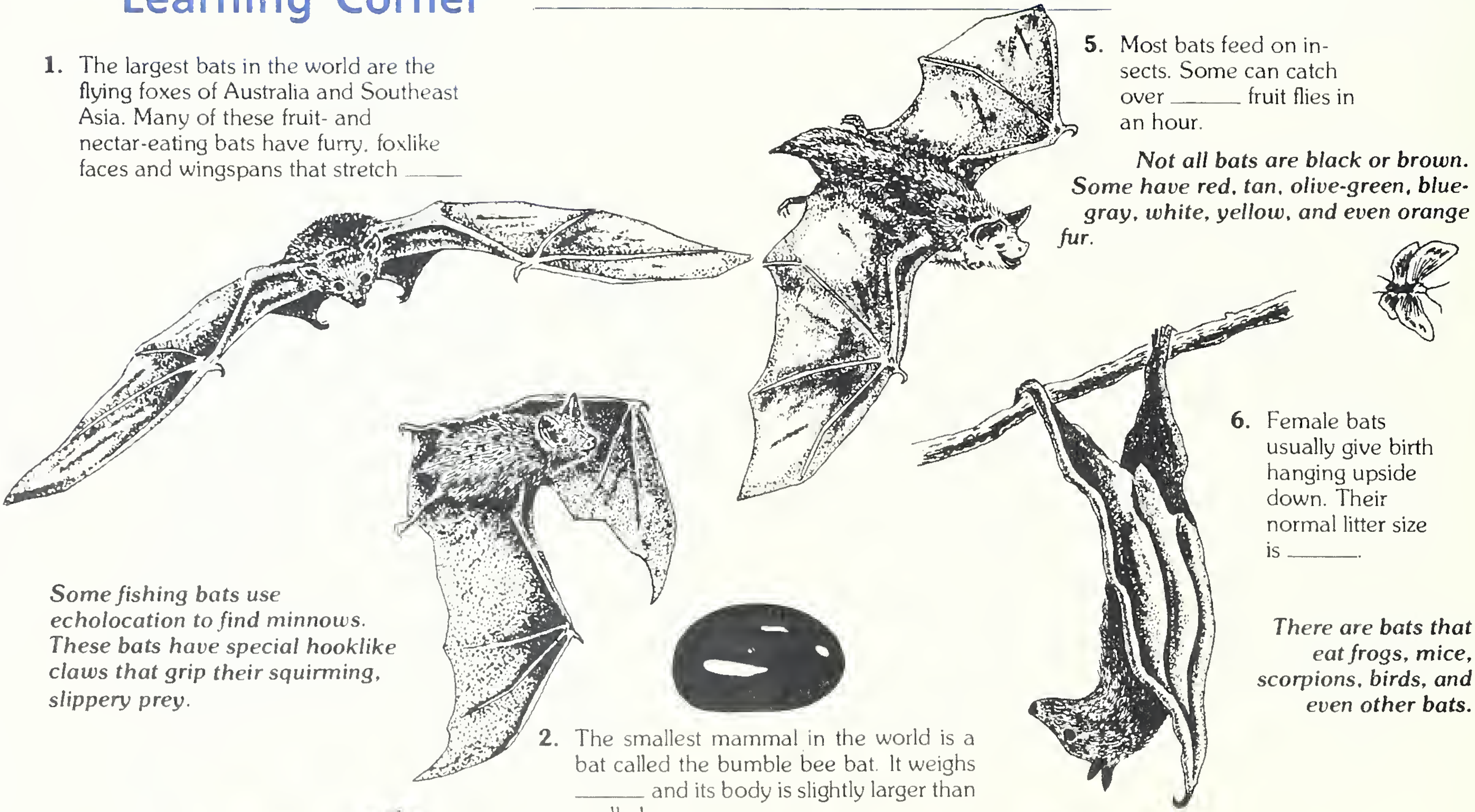
Or think about hanging
All day by your feet,
With your body turned upside down.
The world must look different
From a bat's point of view,
With everything twisted around.

But hanging around
Is only for days,
'Cause when twilight fades into night,
Many bats hit the skies
In search of flies
And other insect delights.

So while most other people
Are fast asleep,
With their cats and dogs cuddled tight,
I'm out walking,
Late at night,
Watching bats swoop around at a light.

RANGER RICK'S NATURESCOPE:

A BAT LIKE THAT



1. The largest bats in the world are the flying foxes of Australia and Southeast Asia. Many of these fruit- and nectar-eating bats have furry, foxlike faces and wingspans that stretch ______

5. Most bats feed on insects. Some can catch over ______ fruit flies in an hour.

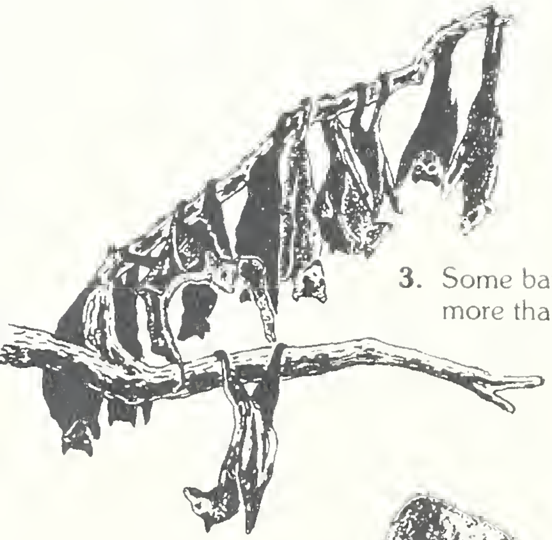
Not all bats are black or brown. Some have red, tan, olive-green, blue-gray, white, yellow, and even orange fur.

6. Female bats usually give birth hanging upside down. Their normal litter size is ______.

Some fishing bats use echolocation to find minnows. These bats have special hooklike claws that grip their squirming, slippery prey.

2. The smallest mammal in the world is a bat called the bumble bee bat. It weighs ______ and its body is slightly larger than a jelly bean.

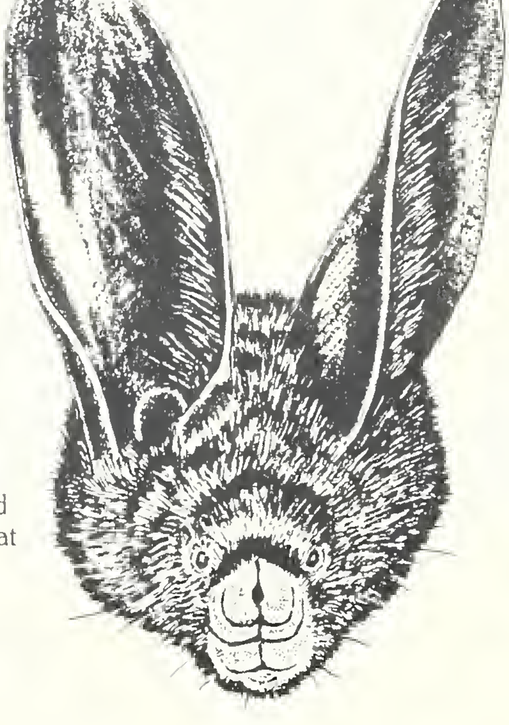
There are bats that eat frogs, mice, scorpions, birds, and even other bats.



3. Some bats live in colonies made up of more than ______ individuals.

7. Vampire bats use their sharp incisors to make a tiny slit in their prey's skin. As blood oozes out, they lap it up. These bats usually feed on the blood of ______.

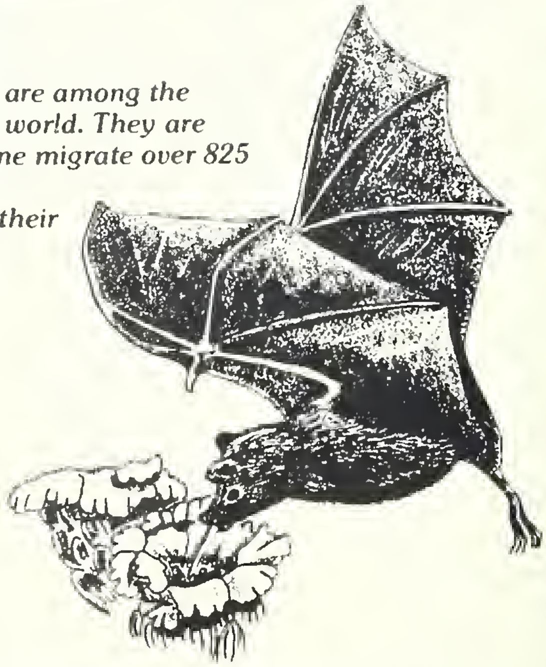
Mexican free-tailed bats are among the fastest-flying bats in the world. They are also great travelers. Some migrate over 825 miles (1300 km) from their summer homes to their winter roosting sites.



Many bats hibernate in caves and other protected places during the winter. During hibernation, some bats lose as much as 30% of their body weight.

4. Many bats have unusual facial features, such as huge ears and strange nose flaps, that ______.

Almost all bats are active at night. During the day, most sleep in communal roosting sites.



8. Nectar-feeding bats have long tongues with feathery tips that reach deep into night-blooming flowers. Many of these long-tongued bats are important plant pollinators in ______.

BAT TRIVIA

1. **The largest bats in the world are the flying foxes of Austria and Southeast Asia. Many of these fruit- and nectar-eating bats have furry, foxlike faces and wingspans that stretch ________.**
   - a. about a foot
   - b. about three feet
   - c. about six feet

2. **The smallest mammal in the world is a bat called the bumble bee bat. It weighs ________ and its body is slightly larger than a jelly bean.**
   - a. more than an orange
   - b. about the same as a half dollar
   - c. less than a dime

3. **Some bats live in colonies made up of more than ________ individuals.**
   - a. 20 million
   - b. 2 billion
   - c. 100,000

4. **Many bats have unusual facial features, such as huge ears and strange nose flaps, that ________.**
   - a. help them fly
   - b. help them attract a mate
   - c. help them navigate and find food

5. **Most bats feed on insects. Some can catch over ________ fruit flies in an hour.**
   - a. 1,000
   - b. 250
   - c. 10,000

6. **Female bats usually give birth hanging upside down. Their normal litter size is ________.**
   - a. 5-7
   - b. 1
   - c. more than 10

7. **Vampire bats use their sharp incisors to make a tiny slit in their prey's skin. As blood oozes out, they lap it up. These bats usually feed on the blood of ________.**
   - a. people
   - b. reptiles and very small mammals
   - c. large birds and mammals

8. **Nectar-feeding bats have long tongues with feathery tips that reach deep into night-blooming flowers. Many of these long-tongued bats are important plant pollinators in ________.**
   - a. parts of North America only
   - b. parts of Asia and Austrialia only
   - c. all tropical parts of the world

(Answers on Last Page)

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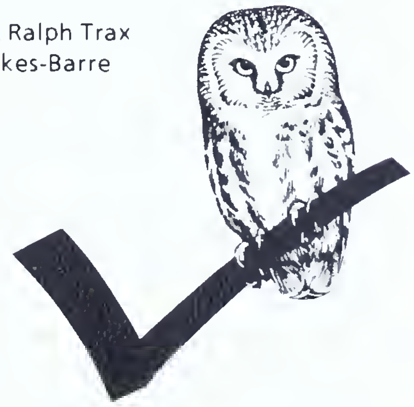

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A STUDY OF ORGANIZED RATTLESNAKE HUNTS IN PENNSYLVANIA

by
Howard K. Reinert, Ph.D.
Associate Professor of Biology
Allentown College of St. Francis de Sales
Center Valley, PA 18015

The geographic range of the timber rattlesnake has decreased substantially throughout much of the northeastern United States during the past century. Concern for decreasing distributions and population levels has prompted many states, including New York, New Jersey, Connecticut, Massachusetts, and Rhode Island, to enact laws that fully protect timber rattlesnakes from indiscriminant killing and collecting. Many biologists and conservationists feel that timber rattlesnake populations in Pennsylvania are also declining and need protection. Organized snake hunts are often cited as a contributing factor in the demise of the existing rattlesnake populations.

Organized snake hunts began in Pennsylvania during the 1950s for the expressed purpose of reducing rattlesnake populations in the northern tier counties. More recently, the hunts have become sporting events and have taken on a commercial aspect. Proceeds from such activities have been used to help support community projects, fire companies and sportsmens clubs. This commercialism, combined with an increased interest in hunting rattlesnakes for sport, has resulted in an increase in the number of hunts held each year. Currently, close to a dozen such events are held annually throughout Pennsylvania. In early years, the rattlesnakes collected were either killed or sold for the production of rattlesnake souvenirs, such as skins, necklaces, belts and hatbands. Recent regulations prohibiting the sale of native reptiles and amphibians and recommending the release of captured snakes have helped to change the purpose and atmosphere of these events.

Protective Mother (Can you find the babies?)
Photo by H. Reinert

A three-year study of organized snake hunts was performed with the cooperation of the Pennsylvania Fish Commission and funding from the Wild Resource Conservation Fund. The purpose of this study was to characterize snake hunts and their participants and to determine whether organized snake hunts could provide information useful for assessing rattlesnake populations and developing management programs. During the study period, 13 organized snake hunts were attended, 139 snakes were examined, and 66 hunt participants were interviewed.

This investigation found that larger numbers of male than female rattlesnakes were turned in at these events, despite the fact that natural populations of timber rattlesnakes have been found to have equal sex ratios. Males attain a larger size than females, and most snake hunts give prizes for the largest rattlesnakes and the greatest number of rattle segments. Many hunters reported that other rattlesnakes were seen and not collected because of their smaller size, or, if collected, they were later released in favor of larger specimens.

Although females were captured less frequently than males, more than 80 percent of the females captured were pregnant. Since timber rattlesnakes produce young only once every two years, this is a significantly higher proportion of pregnant females than occurs in natural populations. The collection of a disproportionate number of pregnant compared to non-pregnant females is due to the preference of pregnant snakes for more open, rocky habitats. Hunters reported that they concentrated most of their collecting activity in such habitat.

A substantial number of snakes were injured during capture. A total of 29 percent of the snakes examined had visible external injuries. The greatest proportion of these injuries consisted of minor skin abrasions and lacerations. Injuries were correlated with the molting condition of snakes and the method by which the snakes were captured. Snakes that were preparing to shed their skin, and snakes that had been collected using nooses or by head pinning had the greatest injury rate.

None of the snake hunt participants collected snakes for food or purposely killed snakes. Most hunters indicated that they hunted snakes for fun and sport, and that they released the snakes they captured. However, many indicated that they often did not release the snakes at the original capture sites. Instead, they released snakes in other areas they deemed more suitable. Timber rattlesnakes utilize the same general activity area each year and have a strong affinity for specific hibernating sites to which they return every fall. The practice of releasing snakes into novel environments results in disorientation and abnormal activity patterns which serve to reduce the probability of survival.

This study concluded that, as currently performed, organized snake hunts are of negligible value in assessing the condition of natural populations of rattlesnakes, or in designing management programs. This is because the snakes collected for these events represent a strongly biased sample in terms of sex, size and reproductive condition, and the reliability of the information obtained from hunters regarding the conditions and location of capture is often suspect. The hunts are also clearly detrimental to existing populations because of the high proportion of pregnant females captured, the high injury rate to individual snakes, and the common practice of releasing snakes at sites other than where they were captured. Although each hunt affects only a small number of snakes, the large and apparently increasing number of events could have a serious combined effect. In addition, organized snake hunts are of marginal educational value for the general public, and, by playing on sensationalism and the public's fear of snakes, they may actually be counter-educational.

Feeding Position of Rattlesnake

Photo by H. Reinert

Based upon these findings, it was recommended that organized snake hunt activity in Pennsylvania be completely prohibited or more stringently regulated and managed by the Pennsylvania Fish Commission. Suggested guidelines for the implementation of the latter option included a reduction of the number of hunts, a hunting season limited to a specified period during the month of July, a prohibition of certain harmful methods of capturing, handling and displaying snakes, enforcement of regulations for release of snakes, a continuation of data collection at hunts, and the implementation of an educational program for snake hunters and the general public at these events.

"WOODWORKING FOR WILDLIFE"

After three years of writing, modifying drawings, and text, and redrawing boxes, "Woodworking for Wildlife" is available to the public. This publication incorporates the latest information for building, placing and main-taining nest structures for wildlife.

The information is for everyone, from children in nature classes to professional wildlife biologists. Included in this publication are plans to build 22 structures that will accommodate 41 species of wildlife.

These woodworking projects can be used as gifts, fund raisers, conservation projects for civic and conservation groups and for industrial arts projects. The ideas are unlimited for the creative individual.

"Woodworking for Wildlife" was a joint project for the Wild Resource Conservation Fund (Pennsylvania's tax checkoff) and the Pennsylvania Game Commission. The develop-ment and publication of this woodworking textbook was made possible by your voluntary income tax contribution on the PA state income tax form.

"Woodworking for Wildlife" is available for $3.00 at:

DO SOMETHING
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Wild Resource Conservation Fund
P.O. Box 1467
Room 101, 3rd & Reily Streets
Harrisburg, PA 17120

ANNUAL MEETING

The Wild Resource Conservation Board held its annual meeting on Wednesday, Nov. 15, 1989, at 1 p.m. at the Pennsylvania Game Commission Office, 2001 Elmerton Avenue, Harrisburg, PA. A full report was presented on the allocation of monies from the Wild Resource Conservation Fund. The Board considered all presentations made at the public hearing and the management plans outlined by the professional and technical staffs of the Pennsylvania Fish Commission, Pennsylvania Game Commission and Department of Environmental Resources.

The recommendations funded by the Board will be administered by the Pennsylvania Fish Commission, the Pennsylvania Game Commission and the Department of Environmental Resources. The recommendation selections were based on their individual contribution to the management goals of the three agencies and those outlined in the Wild Resource Conservation Act.

Bat Trivia Answers:
1. c, 2. c, 3. a, 4. c, 5. a, 6. b, 7. c, 8. c

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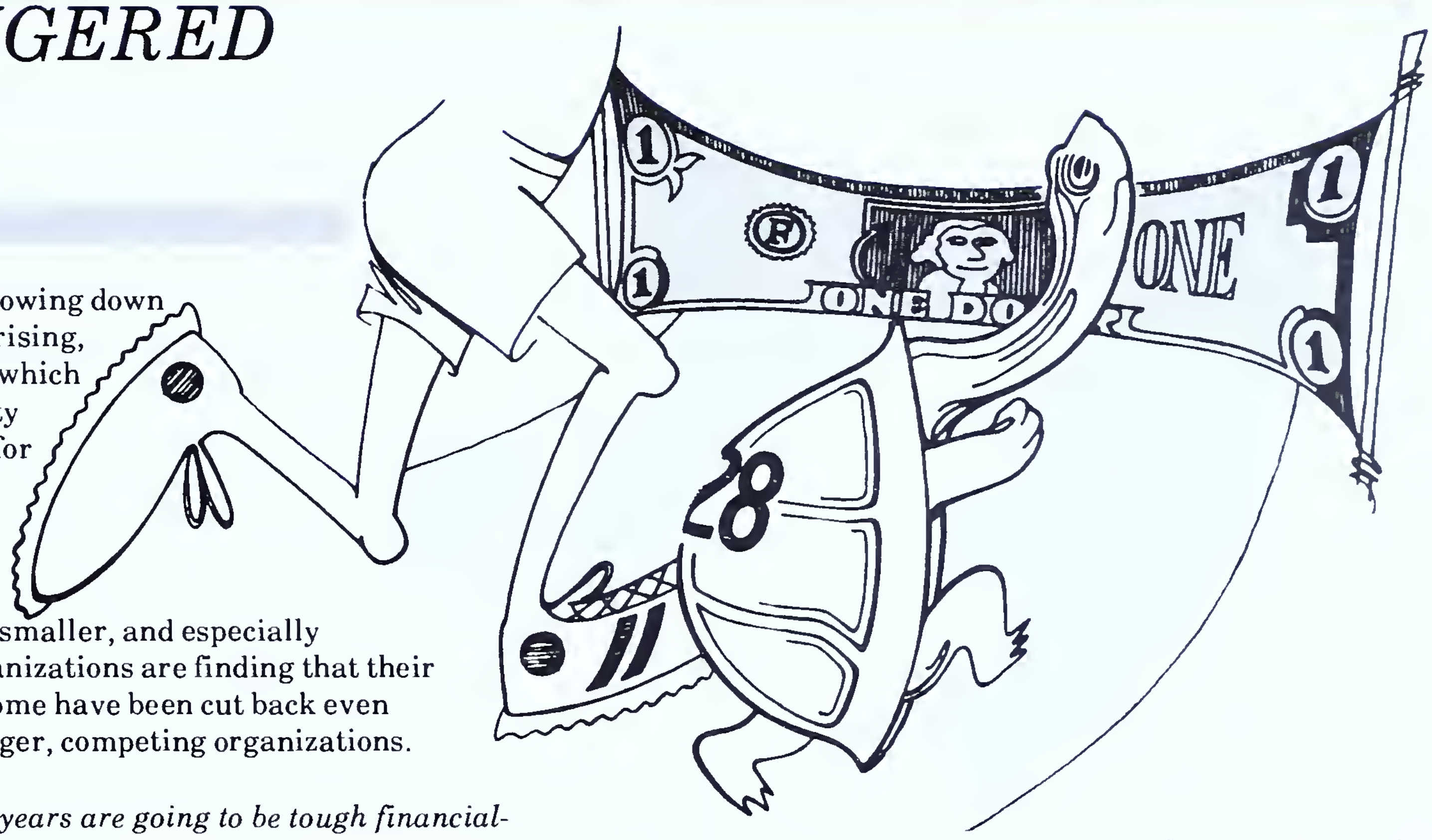
KEYSTONE WILD NOTES

A COOPERATIVE PROGRAM OF THE PA. GAME COMMISSION, PA. FISH COMMISSION, PA. DEPARTMENT OF ENVIRONMENTAL RESOURCES AND DIRECT CONTRIBUTORS TO THE WILD RESOURCE CONSERVATION FUND

Winter 1990

ENDANGERED FUNDS



With the economy slowing down and unemployment rising, those organizations which rely on the generosity of patron donations for income are finding 1991 to be a year requiring more creativity in fund raising efforts. The smaller, and especially environmental, organizations are finding that their usual sources of income have been cut back even further by other, larger, competing organizations.

"The 1991-92 fiscal years are going to be tough financially for the Wild Resource Conservation Fund (WRCF)," said Executive Director, Frank Felbaum. *"The 'Fund' is in deep trouble; when you loose approximately one-third of your budget, what can you expect? There isn't any group around that can loose a third of its income and be expected to perform the same way."*

One of the other reasons for this budgetary shortfall is due to the presence of competing tax check-offs on the PA State Income tax form. This check-off is the only significant source of income for the WRCF. **During the last eight years the "Fund" has functioned WITHOUT any state funding**. This is not the year to count on any state general fund money, considering the condition of the economy. The anticipated shortfall in 1991 is over $200,000 and 1992 is projected to be over $250,000. *"The WRCF is heading for a financial disaster"*, stated Felbaum.

In previous years, the "Fund" drew from a group of proven givers that averaged 7 percent of all the contributors. In 1988, the precedent of a second tax check-off was introduced. That year the pool of contributors was divided between the "Fund," at

Continued on page 5

WHAT'S INSIDE

"The Baily Twins' Outdoor Adventures"

Otters Return To Western Pennsylvania

Learning Corner

1991 Projects, Funded

Helpers Needed

STATE LIBRARY OF PENNSYLVANIA
DOCUMENTS SECTION

"The Baily Twins' Outdoor Adventures"

An outdoor ethics/environmental education booklet, titled *The Baily Twins' Outdoor Adventures*, is hot off the press and available at the Wild Resource Conservation Fund's Office in Harrisburg.

This 40-page booklet appeals to children ages 9 through 12 because of its easy-to-understand short stories and activities, and colorful comic book format. It is designed to help them understand ways that they can influence their environment. It shows them how to act responsibly and become better caretakers of Pennsylvania's natural heritage. It encourages children to get involved in efforts that ensure a safe and healthy world in which to live, work and play.

Issues covered include the importance of air, water, and wetlands; wild plants and animals endangerment; landowner relations; good sportsmanship; and litter and recycling. The stories and activities can be expanded upon and related to other similar issues. For example, catch and release of fish can easily be associated with voluntary restraint when hunting ducks or collecting sassafras roots to make tea. A good conservation ethic dictates lifestyle changes, which works best when voluntarily done by the individual rather than mandated through legislation.

Stories center around the daily activities of the Baily Twins', Jeff and Joni, and their friends such adventures as *"The Secret at Wildcat Swamp"*, which shows the importance in providing food and habitat for an abundance of life; *"The Corn Field Mystery"*, which aims at good landowner relations as the key to continuing to have places available for future outdoor activities; or *"The Mystery at Bumblebee Hollow,"* which reminds us of our responsibility to keep roadsides and streamsides litter free.

The booklets are available for 50 cents each to private groups, or free to schools throughout Pennsylvania. If desired, there is space on the inside front cover for private groups to individualize each book with a "Compliments of ______________" stamp, for give-aways to youngsters.

As a supplement, teachers' guides are available to school districts, providing leaders with additional activities and resources. The material is easily adapted as a complete eight-week program, or can be used in sections as the curriculum allows.

The production of *The Baily Twins' Outdoor Adventure* was financed by the Pennsylvania Wild Resources Conservation Fund. The Wild Resource Conservation Fund is Pennsylvania's income "Tax Check-Off" on your state tax form.

Contact the Wild Resource Conservation Fund,
P.O. Box 1467, Room 101, Third and Reily Streets,
Harrisburg, PA 17120

★ ★ ATTENTION ★ ★

Helpers Needed

Any interested persons and any Boy Scouts, Girl Scouts, 4-H Clubs, Grange and Conservation Groups

The month of April 1991 is Earth Action Month along with April 21-27 being National Wildlife Week. The Wild Resource Conservation Fund needs your help in a Spring Widlife-A-Thon (SWAT).

These are the four categories in which you can participate:

1. Birdfeeder Watch:

   Collect pledges for the number of birds that appear at a birdfeeder.

2. Robin Count:

   Collect pledges for the number of robins counted or found around the home and/or on a nature walk.

3. Wildlife Safari:

   Collect pledges for all the different types of wildlife identified and counted on a field trip or nature walk.

4. Wildlife Coin Canister:

   Place wildlife coin canisters in your local businesses for the month of April.

The time period for the Wildlife-A-Thon should be sometime during the month of April and the emphasis should be on National Wildlife Week. You can select any one or all four categories.

Pledge forms and coin canisters will be supplied by the Wild Resource Conservation Fund. For more information call 717-783-1639.

PA WILD RESOURCE CONSERVATION FUND 1990-1991 PROJECTS

On November 14, 1990, Pennsylvania's Wild Resource Conservation Board approved $287,595 in funding. WRCF income was greatly reduced. The Board received 35 applications requesting $496,362.48 project funding, but only approximately half of the projects could be funded. The contributions received from taxpayers in 1990 funded 24 projects to protect and manage the Commonwealth's nongame and wild plant species. The approved projects include:

- $50,000 - *Pennsylvania Natural Diversity Inventory.* Western PA Conservancy
- $50,000 - *Pennsylvania Natural Diversity Inventory.* The Nature Conservancy
- $ 2,000 - *An Inventory of PA Hepatics and Liver Worts.* G. Christine Manville, The Bryophyte Technical Committee
- $ 3,000 - *Presque Isle State Park Exotic Plant Control Project-Phase 2.* James Bissell, Cleveland Museum of Natural History
- $ 2,025 - *Herbarium Studies of PA Plants of Special Concern.* Sue Thompson, Carnegie Museum of Natural History
- $ 1,000 - *Status Survey and Monitoring of Plant Species Protected by Endangered Species Act*
- $12,000 - *Review of 50 Tentatively Undetermined Plant Species of Special Concern.* Ann Rhoads, Morris Arboretum
- $12,000 - *Review Surveys of PA Northwestern Wetlands.* James Bissell, Cleveland Museum of Natural History
- $10,000 - *The Assessment of Infrequently Collected PA Mosses.* Dr. Hank Webster, DuBois Penn State
- $ 3,642 - *The Field Survey and Suggested Status Assignment to Selected Species from the Plants of Special Concern in PA History.* John Oliver, Western PA Conservancy
- $ 3,642 - *Status Survey of Selected Tentatively Undetermined Plant Species in PA.* Anthony Wilkinson, The Natural Conservancy
- $33,585 - *Biodiversity of Fishes & Invertebrates in French Creek Crawford County.* Dr. Jay Stauffer, Penn State
- $16,341 - *Field Surveys to Establish the Rare, Endangered or Extirpation Status of Western PA Unionidae.* Dr. George Davis, The Academy of Natural Science
- $19,060 - *The Effect of Geographic Displacement on the Behavior and Survival of the Timber Rattlesnake.* Dr. Howard Reinert, Allentown College
- $ 5,000 - *Tioga-Hammond Support of Osprey Hacking and Northeast PA Osprey Nest Site Management*
- $ 7,000 - *The Effect of Forest Fragmentation on Songbird Populations in PA.* Laurie Goodrich, Hawk Mountain Sanctuary
- $11,700 - *River Otter Restoration in Western PA.* Tom Serfass and Dr. Robert Brooks, Penn State
- $12,500 - *The Effects of Adjacent Land Use on Forest Bird Communities.* Dr. Margaret Brittingham, Penn State
- $ 2,500 - *A Continuation of the Survey of Summer Resident Bats in PA.* Kenneth Anderson, Gannon University
- $21,000 - *Statuses and Habitat Relationships of Small Mammal Species of Special Concern and of Special Scientific Interest in Northeastern PA.* Dr. Gordon Kirkland and Michael Steele, Shippensburg University
- $ 1,500 - *Influence of Spatial Factors on Rate of Snag Fall.* Amy Richert, Shippensburg University.
- $ 2,300 - *Activity Patterns of Vespertilionid Bats in Four Habitats, Forest County, PA.* Dr. Pete Dalby, Clarion University
- $ 4,000 - *Population and Genetic Structure of Woodrats in the Stranford Cave Area.* Alicia Linzey
- $ 1,800 - *Yellow-Bellied Flycatcher Status and Distribution Study.* Douglass Gross, Ecology III, Inc.

All the above projects are in grave jeopardy for next year. The cause for concern is a competing tax checkoff. All the causes for competing check-offs are worthwhile; however, there are already many other private organizations that can adequately raise dollars for these causes. The dollars raised by the tax check-off is the only funding mechanism for the Wild Resource Conservation Fund projects. There are no general fund dollars allocated to these projects.

OTTERS RETURN TO WESTERN PENNSYLVANIA

by
Daniel Brosky

A historic event took place in Northwestern Pennsylvania on the afternoon of Wednesday, June 27, 1990. In a cooperative effort, the Wild Resource Conservation Fund (one of Pennsylvania's Income Tax Check-offs), the Pennsylvania Game Commission, Pennsylvania State University, and East Stroudsburg University have reintroduced four river otters to the Allegheny drainage. There have been 39 Otters released in three drainages thus far. The other sites have been Kettle Creek, Pine Creek, and the Loyalsock. Funding provided through private donations and the Pennsylvania state tax form check-off donations enabled this reintroduction project to be possible.

This release has also been supported by the area trappers, fisherman, campers and local residents. While a large group of sportsmen and media looked on, the Pennsylvania Game Commission officers assisted the Penn State biologists in setting free one female and three male river otters at the confluence of Tionesta Creek and Minister Run. This site is located in the Allegheny National Forest, and was chosen after an extensive, multi-county analysis by Project Coordinator Tom Serfass. The otters have been received from New York State, with more otter promised, as well as live trapping planned in the Poconos.

The male otters settled into two overnight dens within several hundred yards of the release site, while the female Otter ventured two miles upstream before building her bank den that night. This movement is typical according to Tom (known by the group as "Father Otter").

There are plans for twenty-one more otter to be released in the same location this fall. Serfass says that this will establish a strong breeding population, with the final sex ratio being about 1/1. Tom and his team remained in the area for two weeks to monitor the otters at a distance, using telemetry receivers that pick up signals from small transmitters that have been surgically implanted in the otters prior to their release.

About Otters

If playing is indicative of intelligence in animals, then these little critters are the most intelligent of all of Pennsylvania's animals. They love to play with food, sticks and stones, sliding around in the ice, snow and muddy banks, and wrestling with each other. A mature male otter will weigh between 10 and 25 pounds and grow to.between 4 and 4½ feet from the tip of his nose to the end of his long, furry, tapered tail. The female is slightly smaller, but both are very muscular and solid, with bodies that are streamlined for speed and maneuverability in the water. The Otter's movement in the water is achieved primarily by an up-and-down flexing of its body, using the feet and tail for steering, while fish, the otter's favorite food, use a side-to-side body motion to achieve their propulsion. Otters can reach a top swimming speed of about seven miles per hour, can travel about a quarter of a mile under water before coming up for air, and can stay submerged for up to four minutes if the need should arise.

Otters have excellent hearing, and eyesight that is adequate above water while it is terrific below. Its sharp sense of smell is enhanced by long, stiff and sensitive whiskers, located just behind and beneath its nose, guiding the otter in its search for food in murky or turbid water. They typically make their home in dens along the shores of rivers, lakes or streams, but you might see an otter family in a marsh. The den will have an entrance hole underwater and several other openings above the water; their living quarters are above water level.

Otters reach sexual maturity by the age of two years, at which time they will breed anytime between January and May. Mating occurs in the water. The female will carry the fertilized eggs in a dormant state until winter, when the eggs then attach themselves to the uterine wall and begin development. In about two months the young are born, with a typical litter having two or three pups. The female raises the pups, teaching them to swim. She will not let a male otter near her pups for several months, but will breed again shortly after giving birth. The males are polygamous, and may father more than one litter each season.

Once established, an otter habitat needs a constant supply of clean water that can support fish and other aquatic life that the otters depend on for food. Water pollution from strip mine run-off, industrial waste and sewage--all products of human expansion--has contaminated many of Pennsylvania's streams, lakes and rivers. With the enforcement of anti-pollution laws and the clean-up of streams, the population of otters in Pennsylvania should increase.

The Future

The total cost to the WRCF for each release otter is approximately $1,500. This includes the purchase price, implant surgery for the tracking device and animal care while in captivity, plus the necessary field personnel to monitor the activity of the otters for the first several months in their new homes.

"This otter reintroduction program is a good example of how the tax check-off dollars are being spent," said Frank Felbaum, executive director of the WRCF. "Everyone who has contributed on their tax form over the last eight years can be pleased with the wise use of their monies. This release is an accomplishment all the contributors can be proud of."

Frank has recently set up a special otter donation fund. Any checks received will go directly into this account and will pay for the ongoing otter Reintroduction Program. Checks can be made out to "Wild Resource Conservation Fund" and mailed to: WRCF; P.O. Box 1467; Room 101, 3rd & Reily Streets; Harrisburg, PA 17102. An otter pin will be mailed to all those donating $15.00 or more.

Bill Shearer of the Kellettville Sportsmen's Club presented a check to Mr. Felbaum for the Otter Fund at the Tionesta release site. Mr. Felbaum hopes to see more donations from sportmen's club, schools and organizations for this protected non-game species. Frank said, "This was a very successful release. It's exciting to see otter return after the long process of paper shuffling that got us to this point."

Wildlife Week Focus: Earth's Polar Regions

"Fragile Frontiers—The Ends of the Earth" is the theme of the National Wildlife Federation's 53rd annual Wildlife Week, which will focus on ecosystems of the Arctic and Antarctic.

Wildlife Week 1991 will run from April 21-27 to coincide with the anniversary of Earth Day. The Federation has designated the entire month of April as Earth Action Month to highlight steps individuals can take to protect the environment.

ENDANGERED FUNDS

(Continued from front page)

4.9 percent, and the Olympics, at 3.1 percent, the addition of the U. S. Olympic Committee check-off only added one percent of new contributors, while drawing away almost 4 percent of the regular contributors to the WRCF. The legislature passed a budget bill that had the addition of tax form check-offs buried within it, because competing tax check-offs could not be passed on their own merit. Several pieces of draft legislation have been drawn up, but, owing to the slowness of the legislative process, they will not provide any relief for the WRCF in 1991 or 1992. They are long-term relief measures.

Short-term relief plans are implementing a direct mailing to the citizens of the Commonwealth asking for direct contributions, creating a 1991 Spring Wildlife-A-Thon, and starting an industrial and corporate sponsors list. Hopefully, the short-term plans can carry the "Fund" to a stable long-term income situation.

Wild Resources Learning Corner

Ranger Rick's Naturescope:

Mammal Magnets

Make Mammal-Shaped Dough Magnets

Materials:

- *baking soda*
- *cornstarch*
- *cold water*
- *saucepan*
- *stove*
- *spoon*
- *plastic bag*
- *plate*
- *damp towel*
- *small, mammal-shaped cookie cutters (optional)*
- *wax paper*
- *acrylic paints, watercolors, or markers*
- *clean nail polish or acrylic sealer (optional)*
- *paint brushes*
- *glue*
- *small magnets*
- *reference books (optional)*

How to Make Craft

This recipe will make enough dough for at least 20 magnets:

- 4 cups baking soda
- 2 cups cornstarch
- 2½ cups cold water

Mix all of the ingredients in a medium-sized saucepan and cook over medium heat, stirring constantly. Cook about 10 minutes or so, until the mixture is the consistency of mashed potatoes. Remove from heat, turn out onto a plate, and then cover with a damp cloth. After the dough cools, knead it gently into a smooth ball. Then store it in a tightly sealed plastic bag and refrigerate until you're ready to use it.

Follow these easy steps to make colorful mammal magnets:

1. Flatten a golf ball-sized lump of dough onto a piece of wax paper using the palm of your hand. The pressed dough should be at least ¼ inch (6 mm) thick. (Don't press it too thin or else the dough may break as it dries.)

2. Mold the dough into the shape of a mammal, using pictures of mammals for reference (Younger children can use cookie cutters to cut out mammal shapes).

3. Make eyes, a nose, ears, spots, or other features by adding tiny bits of dough or by carving them into the dough with a pencil point. (Be careful not to push the pencil point in too deeply or the dough may break as it dries. Also avoid adding long, thin tails, horns, legs, or other features that may break easily.)

4. Let dry overnight.

5. Carefully remove the mammal shape from the wax paper and paint it with acrylic paints or watercolors or color it with markers. Let dry. (Once your mammal is dry, you might want to paint on a layer of clear nail polish or acrylic sealer (Acrylic sealer is available at most craft stores). This extra layer will protect your creation and make it shine.

6. Glue a small magnet on the back of the mammal (You can get small magnets at some electronic and craft stores). Large mammals may need two magnets.

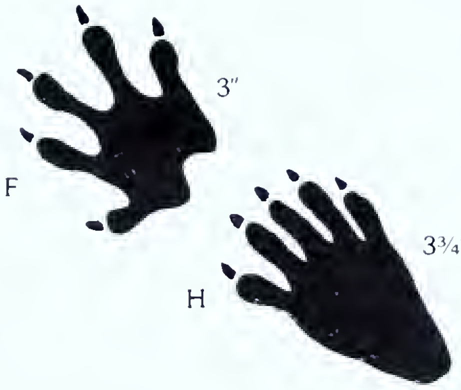
WINTER TRACKS

Can you match the mammal to its tracks on the next page?

1. Whitetail Deer
2. Raccoon
3. Weasel
4. Skunk
5. Red Fox
6. House Cat
7. Red Squirrel
8. Black Bear
9. Snowshoe Hare
10. Beaver
11. Porcupine
12. Muskrat

Answers on Back Page

1



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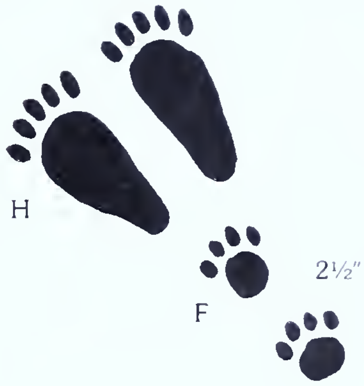

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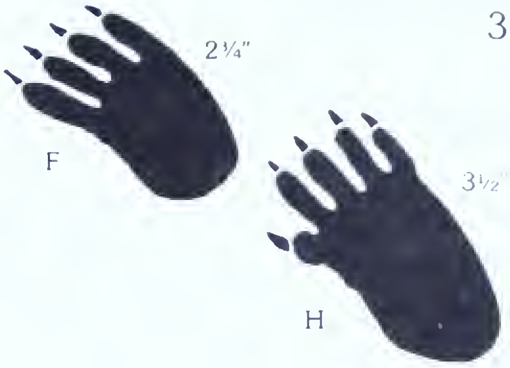

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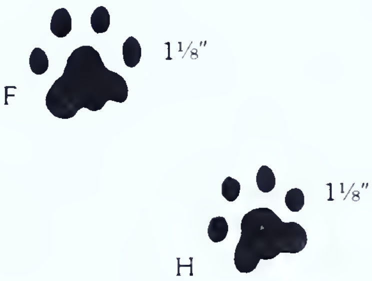

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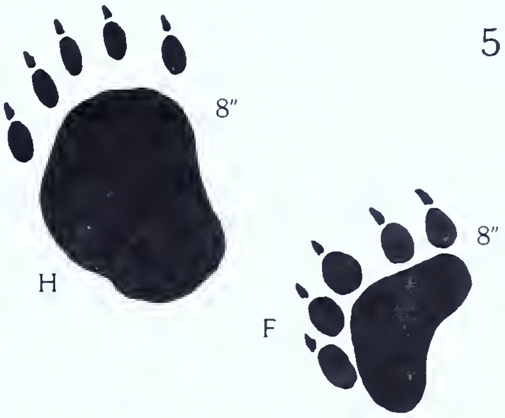

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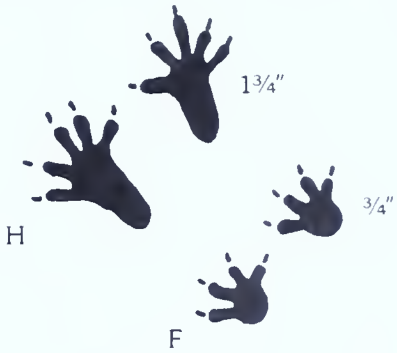

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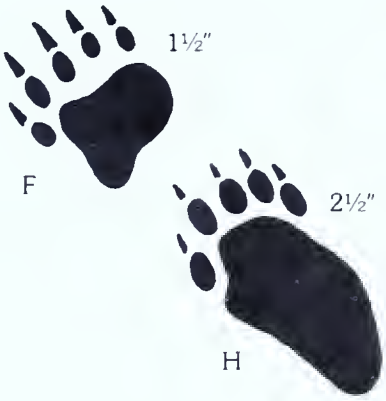

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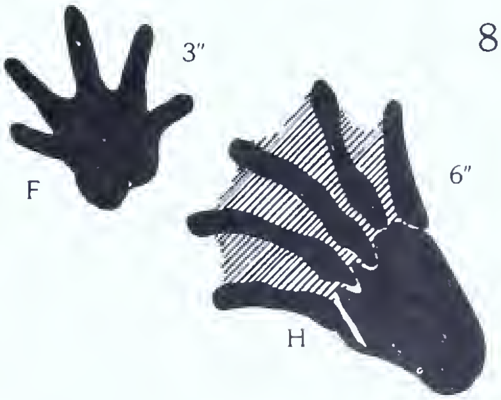

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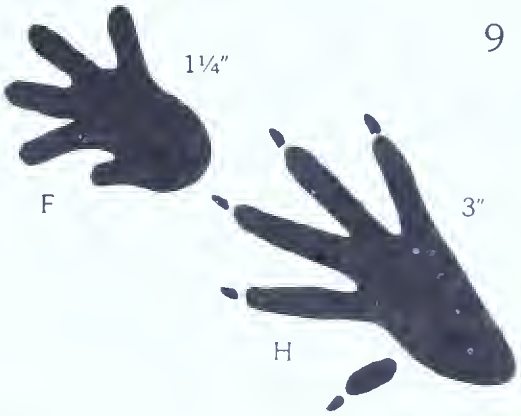

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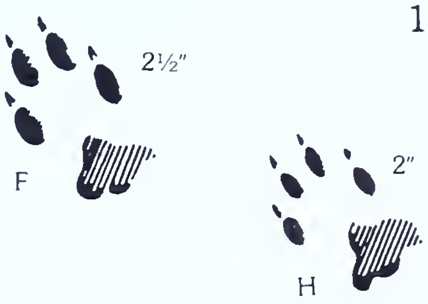

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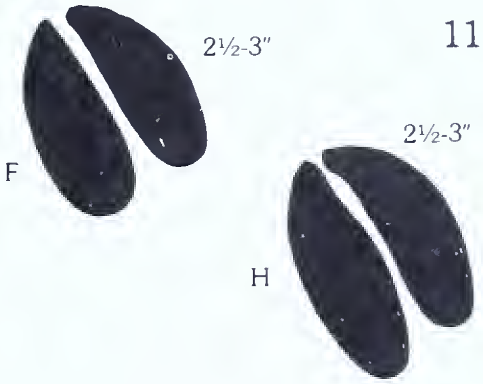

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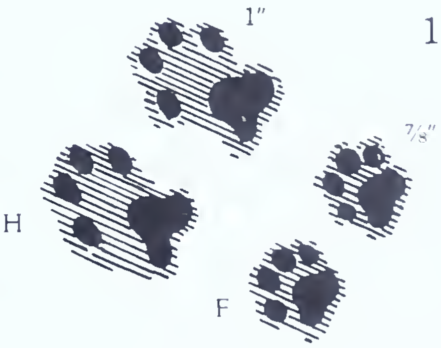

Wild Resource Conservation Fund

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Commonwealth of Pennsylvania

Frank Felbaum
Executive Director/Editor

Wild Resource Conservation Board Members

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Secretary of Environmental Resources

Honorable Peter S. Duncan
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State College

Mr. Clifford L. Jones
Camp Hill

Mr. Walter L. Pomeroy
Camp Hill

Mrs. Jean Stull
Waterford

Mr. Mike Ondik
State College

Mr. Ralph Trax
Wilkes Barre

Answers to Winter Tracks

1. *Raccoon*
2. *Snowshoe Hare*
3. *Porcupine*
4. *House Cat*
5. *Black Bear*
6. *Red Squirrel*
7. *Skunk*
8. *Beaver*
9. *Muskrat*
10. *Red Fox*
11. *Whitetail Deer*
12. *Weasel*

RETURN A GIFT TO NATURE

You can make a difference, make a **Direct Contribution**

Do Something Wild

Enclosed is my contribution of $________________________

Name: ____________________________________

Address: ____________________________________

City: ________________ **State:** ______ **Zip:** ______

Payable to:

Wild Resource Conservaton Fund
Box 1467, Harrisburg, PA 17120

Your "Fund" contribution is tax deductible to the extent provided by law.

DO SOMETHING
WILD

Wild Resource Conservation Fund
P. O. Box 1467
Room 101, 3rd & Reily Streets
Harrisburg, PA 17105-1467

BULK RATE
U. S. POSTAGE
PAID
PERMIT NO. 236
Harrisburg, PA 17105

Address Correction Requested
146 1/91

WILD RESOURCE CONSERVATION FUND
P.O. Box 1467 Harrisburg, PA 17120

DO SOMETHING *WILD*

KEYSTONE WILD NOTES

A COOPERATIVE PROGRAM OF THE PA. GAME COMMISSION, PA. FISH COMMISSION, PA. DEPARTMENT OF ENVIRONMENTAL RESOURCES AND DIRECT CONTRIBUTORS TO THE WILD RESOURCE CONSERVATION FUND

Summer 1990

INSIDE THIS ISSUE

- OSPREY UPDATE
- EASTERN WOODRAT Report
- 1990 WILDFLOWER Poster
- Critter Chatter

PENNSYLVANIA OSPREY: 1989 UPDATE

by
Daniel A. Brosky

The objectives of the 1989 Pennsylvania Osprey Reintroduction Program were monitoring and managing nesting activity of returned Ospreys which were hacked in northeastern Pennsylvania between 1980 and 1986, and developing a plan for constructing hacking towers and associated support facilities at the U.S. Army Corps of Engineers' project at Tioga-Hammond lakes. Again this year, Dr. Larry Rymon of East Stroudsburg University coordinated the reintroduction program.

Hacking is a procedure of removing hatchlings from the nests of their parents and relocating them to a new nest. Here they are fed by hand with food on the ends of sticks by humans who remain hidden behind screens so as not to imprint the image of humans as food providers upon the young Osprey. Once the young mature, they will return annually to this new nesting location.

Dr. Larry Rymon plays peek-a-boo with 2 young osprey ready for banding. (CMS, Marty Ginter)

During the 1989 breeding season, 16 adult marked Osprey returned to the vicinity of their release sites. The return rate was lower than in past years but is still considered well within the range of recovery. There were six active nests that produced 12 young, which was down two hatchlings from last year. Of these, eight survived to the fledging stage. This was due to interferences from other Osprey, inclement weather conditions, and predators or accidents. At this time there is no explanation for the drop in the number of returned adults; however, it is important to mention that to date the only age groups which have been identified are those from 1982-85.

(Continued Next Page)

(Osprey Continued)

Again this year the pair at Portland were the first to return, with the female arriving on March 27 and the male following on the 28th - they have nested there each year since 1985. That same week, one pair at Pocono Lake began rebuilding their nest followed by pairs at Tobyhanna, Francis Walter Dam and Dilldown Creek. Egg-laying took place earlier this year, beginning about April 4, and incubation began on April 10. The first of the young Osprey hatched on May 17 and hatching continued at the sites until May 25.

Banding osprey's is hard work, Dr. Rymon and intern climb nest to get the young osprey. (CMS, Marty Ginter)

While predator guards were placed on all occupied nests and monitoring was continuous during most daylight hours, the 1989 season was not a banner year. Banding was limited to two nests which were accessible for climbing this year and 4 of the 12 young were banded. A series of violent thunderstorms delayed banding at the Peach Bottom nest, and the birds were too close to fledging to band when weather conditions improved.

Pennsylvania received worldwide exposure in the raptor community this year when Dr. Rymon's paper, "The Restoration of Ospreys to Breeding Status in Pennsylvania by Hacking (1980-1986)", appeared in Raptors in the Modern World (B. U. Meyburg and R. D. Chancellor, Eds., Berlin, London and Paris 1989) after being in press in the United States for two years. The Pennsylvania Osprey project was also cited extensively in a new book, Ospreys, by A. T. Poole, Cambridge University Press, (Cambridge, New York, Melbourne and Sydney, 1989).

Metropolitan Edison, sponsors of the film Return From Forever, has continued its coverage and updates of Osprey recovery in northeastern Pennsylvania, and speakers representing the company have given dozens of talks accompanied by screenings of the film around the Commonwealth.

Dr. Rymon and Jerry Hassinger met with Rick Koepple at Tioga-Hammond lakes last year and selected a site for Osprey hacking on a moraine between the lakes. Two very well constructed hacking towers were erected by the Army Corps of Engineers, with provisions made for transportation, care and feeding of 8-to-10 nestlings per year. However, due to the poor production of nestlings in the Chesapeake Bay area, there were no acquisitions, nor could any donor chicks be found for the season.

A supply of chicks for the 1990 season is being sought, as well as funding support from the Wild Resource Conservation Fund for this phase of the reintroduction project.

The 1990-91 season will involve continuing the installation of additional nest poles along the Delaware River and Pocono Mountain area, monitoring 1990 returns and managing nesting activity, and continuing the banding of nestlings in Pennsylvania. Dr. Rymon will advise and cooperate with the Army Corps of Engineers at Tioga Hammond lakes to begin a 5-year hacking program. This is another part of the 1990 project, along with continued publicity and publishing activities which will further enhance the Osprey recovery efforts and promote searches for newly established or expanded nesting sites in the eastern part of the state.

"The most important concept for all involved in such restoration efforts is being mindful that the decline of such species was often gradual, and therefore recovery may also be a bit slower than we wish. Let us all work now so we can maintain the most critical link, habitat, well into the future." - Dr. Larry Rymon, Department of Biology, East Stroudsburg University.

Critter Chatter

Editors note:

The WRCF receives several hundred letters a year from students requesting information and the general public. The letters have been reproduced exactly the way the future conservationists put their thoughts in writing.

This section will appear from time to time using correspondence from the general public. Thanks for taking a minute to let us know what you think.

* * * * * * * * * * * *

Mr. Felbaum:

This money ($35.00) was raised by **2nd grade Special Interest students** from **South Middleton School District.**

The gifted students designed, constructed and sold endangered species buttons at the school's Annual May Fair.

Enclosed is a sample pin and a membership card to our organization: RESA II - Rice for Endangered Species Association II. The students attend Rice elementary School.

Sincerely,
S. Miller, Teach of Gifted

* * * * * * * * * * * *

Dear Sirs:

I am enclosing a check for one dollar. Hope this helps you in your projects, as they sound good. I have taken this money from my pocket money that I allow myself each month.

Sincerely,
Sharon Yost

P.S. I enjoy wild flowers and while I don't fish, members of my family do.

Good Luck!

* * * * * * * * * * * *

Huntingdon, PA

Dear Sir:

Please except this small contribution. I just discovered your address last week in Game News (in my doctor's office). My husband and I never get a refund from state taxes to give to the program and I am delighted to share in your work.

My husband and I love to hunt and fish, and just to walk in our lovely woods. We are currently trying to buy a few secluded acres - a house on it. I've been collecting info from Penn State and other sources on making habitat for wildlife. We're looking forward to helping Pennsylvania wildlife.

Sincerely,
Brenda McCracken

* * * * * * * * * * * *

Orwigsburg, PA

To whom it may concern:

Please find my check for $15.00 for the conservation fund.

I truly care and wish I could send thousands to help our wildlife.

Everytime a tree is chopped down I become upset because more homes are taken from our wildlife in the name of progress so someone can make a buck at the expense of the environment.

Keep writing articles. Make the public aware! Use all the public relations at your fingertips.

With your expertise and the public's awareness, perhaps we can make inroads!

As Felbaum said, "Wildlife belongs to everybody."

Sincerely,
Madeline & Bill Sowers

* * * * * * * * * * * *

Dear Sirs:

Please send me "The Phantom of Fiddler Creek" activity and coloring book. I am very interested in wildlife, so please tell me some tips.

Thank you!

Sincereley,
Kelly A. Shaw

* * * * * * * * * * * *

Final Report on "Survey of the Eastern Woodrat in Pennsylvania"

Eastern Woodrat in its nest. (Photo Hal S. Korber)

by
Dr. John S. Hall, Project Coordinator

This report includes the results of the study of the distribution and status of the eastern woodrat, Neotoma floridana, done under two separate contracts, one for eastern and another for western Pennsylvania. This work was done between 1985 and 1988, with funding provided by the Wild Resource Conservation Fund.

The objectives of this study of the woodrat in Pennsylvania are as follows:

1. To obtain data on all specimens of the woodrat that have been collected in Pennsylvania.
2. To compile the data on any recent observations or trapping records for the woodrat in Pennsylvania.
3. To compile a complete bibliography of literature concerning the species as it applies to Pennsylvania.
4. To locate all the known localities for the woodrat in Pennsylvania and determine if the species is still present at each locality.
5. To search for additional sites and populations of woodrats in Pennsylvania.

The historical and other suitable sites for the woodrat were first plotted on topographical maps. These sites were then found in the field and investigated for the presence or absence of a woodrat population. Each site was studied by first searching for sign of woodrats in the form of droppings, cut vegetation and nest constructions. Live traps were then set throughout the site for one or two nights. The number of traps varied from 20 to 60 depending on the nature of the site. Tomahawk traps were used and were baited with apples.

The first three objectives have been completed. The historic records of the species have formed the base for searching for the woodrat in the state. The listing of known specimens that exist in museum collections was obtained from the computer files of the Pennsylvania Natural Diversity Inventory, with the cooperation of tony Wilkerson and Charles Bier.

The results for 91 sites in 21 counties that have been investigated are as follows.

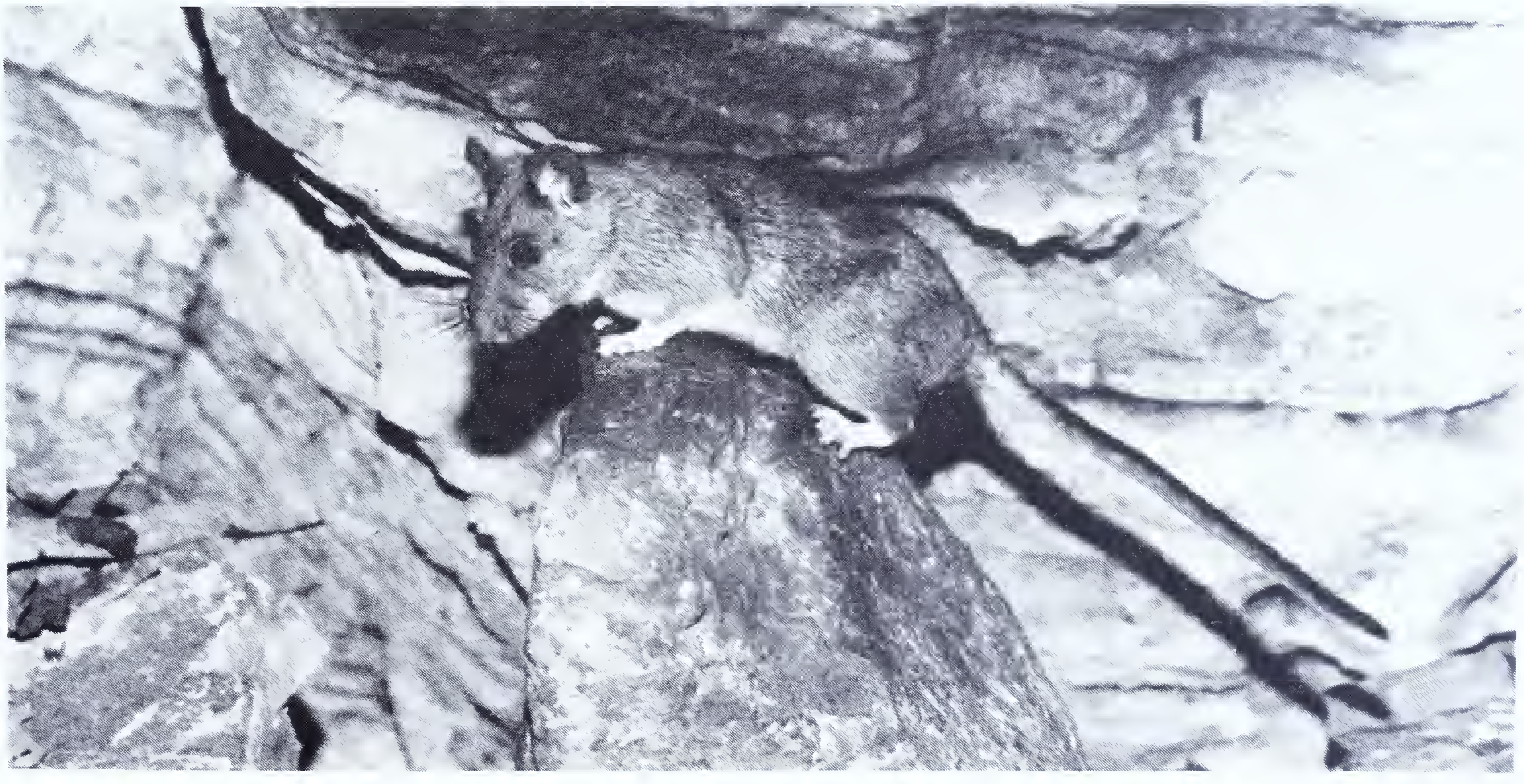
At 58 sites where live traps were set no specimens were captured. At 30 sites woodrats were successfully captured, three other sites showed possible recent extinction from its locale.

Populations of the woodrat have disappeared from many sites in Pennsylvania where the species seemed to be abundant until the late 1960's. At most sites where the species is still present, the numbers of rats caught is low and little sign is present. The only sites which produced a better catch of rats and had more signs were those in Fayette, Bedford and Dauphin counties. However, many possible sites for the species have not been studied, including a number of historical sites.

The one factor that seems to coincide with the loss of woodrats in Pennsylvania is the invasion of the gypsy moth and resulting defoliation of the forest vegetation There is a possibility that acorns make up a significant part of the food supply of the species in Pennsylvania. Acorns may be important as a winter food source since they can be stored for long periods of time. Studies conducted by the Pennsylvania Game Commission show that acorn production drops to zero for several years following defoliation. Gypsy moth infestation has resulted in considerable mortality of oaks, especially along the poorer soils of rocky ridge tops. These are the areas where many rocky sites are found, which are ideal woodrat habitats.

Additional evidence that food supply has been the factor in the decline of the woodrat comes from special conditions found at three sites where the species still remains in eastern Pennsylvania. At Waggoner's Gap, Cumberland County, there is much human activity, and amateur naturalists have apparently left food for the rats over past years. Additional food has been provided for the woodrat population near Marysville, Perry County, by a person for more than 20 years. The active site at Stony Mountain, Dauphin County, contains a stand of mature hemlocks, which the rats feed upon. The presence of hemlocks at the top of a ridge in Pennsylvania is unusual and rare for a woodrat site.

I theorize that the decline of woodrat populations in Pennsylvania has been due to the loss of food supply, especially acorns, because of the effects of severe defoliation by the gypsy moth. Further work needs to be done to substantiate this theory.



Eastern Woodrat makes its home in cave entrances and rocky outcrops. (Photo Hal S. Korber)

Wild Resources
Learning Corner

OSPREY Word Search

by Sandi Myers & Terri Moore

H S I F E P O L L U T I O N W Q R U
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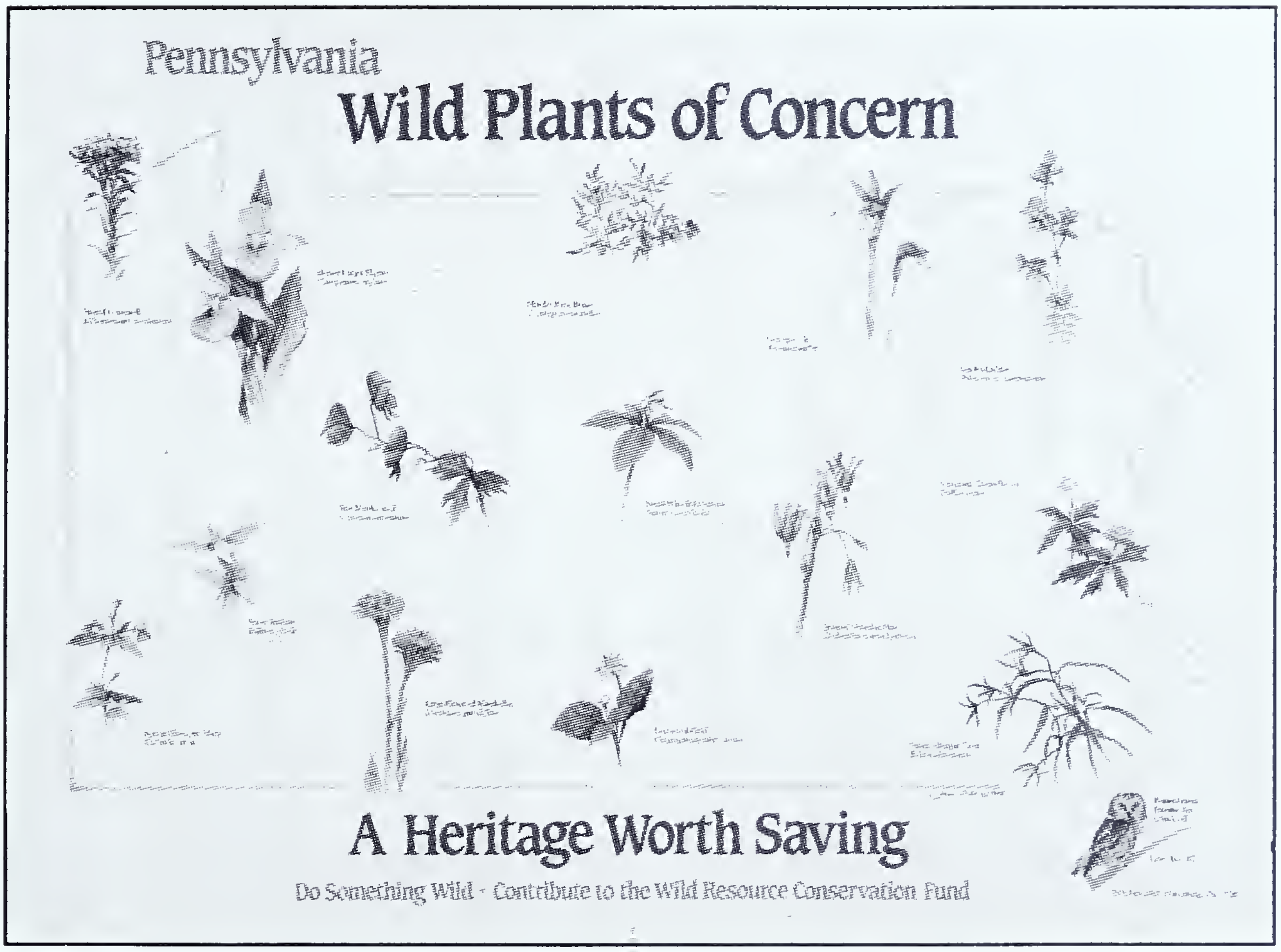
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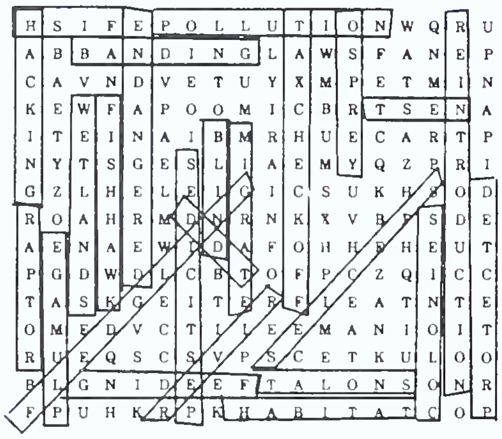

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VOLUNTEER NETWORK NEWS

Pennsylvania Volunteers for Wildlife

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Pennsylvania Game Commission

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DOCUMENTS SECTION

The Volunteers for Wildlife Projects

The Pennsylvania Game Commission and the National Audubon Society offered Pennsylvanians a chance to share their knowledge and enthusiasm by participating in 11 different projects. Well over 1,000 residents responded, and in order of sign-ups, the choices were:

Snag in your backyard — The vertical bird box (2 to 10 feet long) with various-sized openings at different elevations is a man-made snag. Have fun experimenting with this wildlife condominium.

Summer bat trend survey — Participate in the summer solstice bat survey, similar to the Christmas bird count. In two evenings (one hour during twilight), count all bats over a specific area.

Barn owl five trail — Secure nesting sites (where fields, pastures and edges support the rodents these owls eat) may help this species. Build, place and monitor the use of five barn owl nest boxes.

Breeding bird trend survey — Be part of a trend survey to monitor protected bird population trends in habitats represented in proportion to their occurrence in Pennsylvania.

Windows for shut-ins — Install one or more feeders and birdboxes, an evergreen or two and some shrubs on the grounds of a home for the elderly to give them something of nature to enjoy.

Purple martin trail — Since the purple martin has declined here, help the Pennsylvania Game Commission monitor purple martins by finding 10 purple martin houses and keeping track of their use.

Wild resources workshops — Organize and conduct a special evening or weekend workshop that might include a hands-on project that participants take home.

Grassland bird index — Changing farming practices have created problems for grassland nesting birds. Qualified birders will listen and scan for target species at specified points throughout the season.

Shorebird concentration sites — Thirty-two of more than 40 species of shorebirds in Pennsylvania are transient during migration. Find migrating stopover sites to be registered in a shorebird reserve network.

Wetlands slide contest — Submit a series of ten slides that depict wetland wild resources and problems faced by these riches. The slides should visually present the value and plight of our wetland areas.

Find-it contest — Find the largest active purple martin and bank swallow colonies. Game Commission personnel will study the largest colonies to learn what environments are conducive to colonization.

Most of the projects focused on avian activities for a very good reason. Says Walter Pomeroy, regional vice president of the National Audubon Society, "Birds are popular because man has an inherent dream: *I wish I could fly*. And birds aren't like a unique mammal that you may get the chance to see only once every few years. Birds are everywhere, constantly reminding you visually and aurally of your part in the world."

This newsletter, *Volunteer Network News*, is a special issue of *Keystone Wild Notes*, the newsletter of the Wild Resource Conservation Fund. It pays tribute to the spirit of volunteerism in Pennsylvania, focusing on *Volunteers for Wildlife*, a program made possible by the Pennsylvania Game Commission, cooperating with the National Audubon Society. Both the ongoing *Volunteers for Wildlife* program, and this publication, are supported by a grant from the Wild Resource Conservation Fund.

KEYSTONE WILD NOTES

Recycled Paper

"Pennsylvania's public natural resources are the common property of all the people, including generations yet to come." **By instilling a nature ethic at an early age, you're actually helping carry out the commands of our state's Constitution.**

Pa. Game Commission

The charge, and the challenge

by Jerry Hassinger

On May 18, 1971, Section 27, Article 1 of Pennsylvania's Constitution was passed: "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."

This Constitutional amendment was closely followed by passage of both Federal (1972) and state (1973) endangered species legislation. In essence, the primary public demand to conserve and maintain wildlife is from people who want to see Pennsylvania's biological heritage conserved for current benefits and future generations. These people don't want additional birds and mammals to become extinct or extirpated from the state in their lifetime.

This public attitude has forced the profession of wildlife management to grow beyond the traditional bounds of game management. Unfortunately, this growth has not been matched by increased financial support.

The Game Commission is "trustee" of all wild

(Continued on page 2)

Volunteering: It's our heritage

In 1804, John James Audubon wasn't yet 20 years old when he conducted the world's first bird-banding study. At his home in Mill Grove, Pa., the young painter tied a silver thread to the leg of a phoebe. The flycatcher returned one year later, thread intact.

"That story perfectly demonstrates that Pennsylvanians have a long heritage of dedication to conservation volunteerism," says Walter Pomeroy, regional vice president of the National Audubon Society.

Along with the world's best known wildlife artist, several other Pennsylvanians with strong conservation convictions serve to inspire.

- The Pittsburgh home of volunteer naturalist/scientist Rachel Carson is now a shrine to early environmentalism. Her book, *Silent Spring*, changed the use of environmentally destructive pesticides.
- Gifford Pinchot helped turn forestry into a science-based profession before becoming governor.
- Amateur Philadelphia ornithologist Richard Pough inspired Rosalie Edge and others to help stop raptor slaughters along a flyway through Berks and Schuylkill counties, leading to the creation of internationally known Hawk Mountain Sanctuary.

Citizen involvement has and will continue to shape the course of our conservation history. "It was that spirit of dedication in Pennsylvania that lead the National Audubon Society and the Pa. Game Commission to sponsor the multi-year experiment called *Volunteers for Wildlife*," says Pomeroy.

"Volunteers supply well-trained eyes and ears, and they have a desire to help our agencies manage wildlife. There's so much to do to protect wildlife and habitat that agencies can't do because there's not enough money."

The charge

(Continued from page 1)

birds and mammals. However, almost two decades after amending our state's constitution and passage of endangered species legislation, this trusteeship is still — as it has been for almost a century — largely confined to about 20 percent of the wild birds and mammals found in Pennsylvania, namely the game species. Because, unlike Missouri, where a fraction of the state's sales tax is earmarked for the conservation of *all* natural resources, the direct costs of trusteeship in Pennsylvania are almost wholly dependent on sportsmen, license fees and excise taxes.

For better or worse, human impacts on wildlife habitat affect *all* species and not just those labelled as game animals. In fact, effects on game animals are often positive, because the caretaking of these species is underwritten by sportsmen. Not so with other species; no fiscally obligated counterpart constituency exists. Consequently, in the latter half of this century, many of the wild birds and mammals that have suffered serious declines are found in the ranks of those 208 species that are collectively referred to as nongame.

Box Score

The Pennsylvania Game Commission is trustee of a varied resource.

	Number of species
Wild mammals	65
Game and furbearers	21
Non-game or protected	44
Endangered	3
Threatened	3
Wild mammals extirpated from state	9
Wild birds (total historical record)	381
Wild birds (regularly found)	263
Wild birds breeding in state	203
Breeding and found during Atlas years	189
Game birds	25
Non-game or protected birds	164
Endangered birds	6
Threatened birds	7
Breeding birds extirpated from state	9
TOTALS	
Game Birds (breeding only) & Mammals	**47**
Protected Birds (breeding) & Mammals	**208**

We need to recognize that whether game or nongame, if our wildlife heritage is to be conserved and maintained for the benefit of "all the people, including generations yet to come," then: **one**, an inventory and monitoring system is needed to constantly assess the welfare (increases, stability, decreases) of all native species and their habitats; **two**, a substantially expanded effort will be required to select, conserve and/or possibly restore the habitats necessary for preservation of all native species; **three**, in addition to sportsmen, others must be obligated — by legislation — to support the costs of these new tasks; and **four**, ***basic to the accomplishment of the foregoing tasks, environmental education, and the opportunity for wildlife-recreation must foster an awareness of, concern for and constructive action on behalf of all wildlife resources.***

Wildlife watching: Its extent and value

When it comes to awareness, results in the 1980 and 1985 National Survey of Fishing, Hunting and Wildlife-Associated Recreation suggested that Pennsylvanians are off and running. Between 1980 and 1985, there was a 15 percent increase in the numbers of residents *aware* of wildlife.

By 1985, almost 7 million adults (16 years old and older) and 1.2 million youngsters (6 - 15 years old) were participating in non-consumptive wildlife activities like feeding wild birds, or going out of their way to observe wildlife.

During 1985, 82 percent of all Pennsylvania hunters engaged in a non-consumptive wildlife activity; 30 percent traveled over a mile to do so. In the same year, more than 5 million Pennsylvanians (age 16+) who neither hunt nor fish participated in non-consumptive wildlife activities; and more than a quarter of them traveled over a mile to do it.

In 1985, Pennsylvania led the nation with over 31.5 million days of "...taking a trip or outing of at least one mile from home for the primary purpose of observing, photographing or feeding wildlife." We also led the nation in attracting nonresidents --tourists spent 4.7 million days on non-consumptive wildlife activities here.

We spend $62 million on bird seed, $9.5 million on bird feeders, houses and baths, and $451 million on non-consumptive wildlife activities that include trips, art, magazines or books.

At 6 percent sales tax — for bird seed alone — it's estimated the General Fund has accrued more than $22 million since 1985. And what is tourism worth? Although our Constitutional amendment acknowledges the Commonwealth as trustee of the state's public natural resources, no General Funds have ever been earmarked or rebated for wildlife conservation.

It's true! Wildlife generates more revenue with less public investment than any other resource. It's also true that three of every four Pennsylvanians over 16 years of age are participating in some form of wildlife-based recreation.

A volunteer's value

Jerry Hassinger, supervisor of the Pa. Game Commission's Endangered and Protected Wildlife Unit, knows that support for comprehensive wildlife programs can be increased if opportunities are provided for personal involvement by volunteer citizens. Equally important, volunteers can help achieve wildlife conservation objectives.

"For new wildlife initiatives, or restoration of an endangered or uncommon species, new funding is not readily available. As a result, many states have gone to a tax check-off to help fund their programs. But even contributing your tax overpayment is nothing more than volunteered money. And it's never been a sufficient amount in any state to do an adequate job. To fill in that gap, we have come to rely heavily on volunteers," he says.

Take a look at a database as highly developed as the Pennsylvania Natural Diversity Inventory (PNDI), and you'll know that volunteerism is alive, well and educated in this state, says Charles Bier, of Western Pennsylvania Conservancy, one of the coordinators.

The inventory is a database of more than 7,750 locations of the Commonwealth's most unique and important natural resources, maintained by the state Department of Environmental Resources' Bureau of Forestry, with cooperation from two conservancies. The majority of information in this irreplaceable database was generated by volunteers, and continues to be updated by sharing their knowledge.

"The Breeding Bird Atlas project — an inventory of every species of bird known to be nesting — didn't call upon expert ornithologists. The people who compiled that data were plain old birders, more than 1,000 across the state. Without them, you just couldn't do something like that. Pennsylvania is the first state to have every block in every quadrangle covered, and that is a tribute to the willingness and dedication of volunteers," says Bier.

The PNDI and the BBA are two of the biggest-ticket volunteer projects in the state. But to find similar success and dedication, you don't have to look much past your own neighborhood to find Volunteers for Wildlife.

Relying on volunteers to watchdog, monitor and protect the natural resources that deserve more attention by our government may not be the most satisfying approach. But for the professionals like Hassinger who have no choice but to depend on the help of volunteers, it's important to hear him believe in its worth.

According to Hassinger, "The Volunteers for Wildlife projects were chosen with three questions in mind. What kind of projects appeal to volunteers? How well would volunteers perform without field supervision? And would multi-year projects hold the volunteer's interest beyond the first year? Generally, volunteers chose projects that didn't require a group effort. They preferred to work alone, in pairs or as a family. Building and placing bird boxes is ever popular. The vertical snag had a great appeal. As it turns out, however, the placement of individual bird boxes is more efficient. **Of most help to the Game Commission are multi-year inventory projects.** For the summer bat surveys and the grassland breeding bird surveys, volunteers are not only "hanging in there," but they are doing so in spite of the difficulty and boredom associated with collecting habitat data."

Julie Lalo

Summer bat surveys: Hassinger offers a "well done" to the volunteers who tallied more than 12,000 bats leaving maternity sites. "We have to know where these sites are before we can protect them," Hassinger says. "The largest maternity site contained more than 5,000 bats. Four of nine large maternity colonies were found in country churches. At least 86 percent of all the bats counted were using these churches. Largest maternity colonies are characterized by the presence of water and wetlands: over 50 percent coverage within a half-mile radius."

"Volunteers are helping us establish a centuries-end (1988 to 1993) baseline index of habitat-specific, summer bat activity. Over 100 volunteers completed 112 bat activity surveys. Bat watchers tallied 11,691 bat passes for 224 count nights for an average of 104 passes per site. Highest bat activity was associated with forest and wetland habitat. (90 percent coverage within 100 yards of the surveyors). Lowest or zero bat activity was positively associated with openland and suburban habitat."

"I've been overwhelmed by the creativity of the Volunteers for Wildlife," says Jerry Hassinger, supervisor of the Game Commission's Endangered and Protected Wildlife Unit. He believes it when he says, "Citizen help can make a difference."

Grassland breeding birds: For a variety of reasons, grassland breeding birds are in trouble. As a group, they are suffering long-term declines. Volunteers can help us keep track of these birds and their habitat. Results will help the Game Commission more accurately prioritize the future research and management strategies. The ultimate goal of these strategies is to prevent species from becoming threatened or endangered. Volunteers completed 46 routes the first year (1989). Each route consisted of 30 3-minute stops for a total of 1,380 survey sites, scattered in 29 counties.

Julie Lalo

It takes a keen ear, discipline and recognition of just about every likely bird species you'll encounter along your Breeding Bird Survey route, says Paul Schwalbe, pictured here with his wife and birding partner, Glenna. Schwalbe has coordinated the state's BBS volunteers for 25 years.

Name that tune

Can you do this? Get up while it's still the night before, and be at your perch at 5 a.m., one half-hour before sunrise. Take the air temperature, note the wind speed and the nature of the habitat around you.

Your partner whispers "start," and for the next 180 seconds, you tune your ears. Aurally remove all human-made sounds. Peel away the layers: the grinding of automobiles, the yelp of backyard dogs, the flight of jets. Scan the skies and pluck from the air the calls: perhaps it's an Acadian Flycatcher, three separate Wood Thrush, a Blue Jay.

Announce each species that you see or hear until your time-keeping partner commands you to stop. Jump in your vehicle, drive one-half mile to your next appointed location, hop out, and begin your catalog of avian sights and sounds all over again. Do this 50 times in a row.

Can you do this? If you can, you just might have a future as a volunteer breeding bird surveyor.

Don't mistake the requirements. Paul Schwalbe, Pennsylvania's coordinator for the National Breeding Bird Survey (BBS), says anyone who conducts one of these surveys must be an experienced birder, willing to spend a "full" morning in June running the route (ready to try again another day if weather conditions on the appointed day don't suit the criteria), able to recognize the difference between species that breed here (as opposed to migrants passing through), and know all the songs he or she is likely to hear.

"It's almost all by ear. You have to know the songs, because you'll never see 99 percent of the birds you count," Schwalbe says. Even this retired professor of biological science, specializing in ornithology at Lock Haven University, refreshes his birding ear every year prior to the counts.

"All year, my wife Glenna and I study the bird songs, and especially every spring. Although we're experienced, there are over 30 warblers in the east, and each warbler doesn't have just one song. One Song Sparrow can have 16 different songs. Most of them sound almost identical to the average human ear, but they do mean something to another Song Sparrow," he says.

Birders who travel to different parts of the state know that just like humans, birds enunciate with regional accents. "What the Common Yellowthroat sounds like here is not what it sounds like in Pittsburgh or Philadelphia or Wilkes Barre. It's the same basic pattern with a variation," he says. Just like asking for a glass of "wah-ter" in Pittsburgh, or "wood-er" in Philadelphia.

That's why Schwalbe, who coordinates the state's efforts in this national project, likes to get a single birder on a route and keep that person conducting the survey year after year. "It helps maintain consistency since we all have different levels of expertise," he says.

Schwalbe has been running his own routes and handling the coordinating since the BBS began 25 years ago. "For state coordinators, I'm as old as they come!"

Every one of those 25 springs he's had to insure there were birders to run the surveys. Total saturation in the state would be a birder on every one of the 100 routes in the state. "We've never had 100 percent coverage, but 60 to 80 routes are done every year," he says.

He does three, and Margaret Higbee, from Indiana County, is the volunteer with the distinction of doing the most surveys in this state. She and her husband Roger run five, a challenge that has earned her a place in the national listings of diehard BBSers.

The way she tells it, the transition from one route to five seemed quite natural. She and her husband took over a route in Washington County, moved to Indiana County, where they took on three more, and then added another in Armstrong County. "The only problem is when we get a rained-out Saturday. Then my husband takes a vacation day to do it," says Higbee.

Even though the farthest route is a two-hour drive away, "We'd hate to give it up, we're just starting to see data," she says, referring to trends in the counts that she is starting to study and analyze.

Higbee is no ornithology professional, but she is a devoted birder who got started when she was still a child. "I was behind our house in Cincinnati, and saw an all black and white bird with a red blotch on its chest. I thought it had been shot. I ran home and looked it up and learned that that's just what a Rose-breasted Grosbeak is supposed to look like!" She and her husband keep an avian life list, and have already spotted almost 600 separate species (800 different species are possible).

When asked of advice for novices, she had a ready answer. "The main thing is to learn the bird songs. Learn the easy ones first. Don't bother with record albums. Just hear a call and then find that bird. You remember better if you have to track it down."

Biologists at Patuxent Wildlife Research Center, in Laurel, Maryland, combine Higbee's, Schwalbe's and all of the other in-state bird data with those collected on more than 2,070 other runs throughout the country and Canada. The result is science-by-volunteer.

Schwalbe says that even if you think you aren't knowledgeable enough to run a survey, you might be able to "intern" up to it by being a surveyors' timekeeper and recorder.

But you have to remember that you can't coach the person naming the birds. "If the recorder sees or hears a bird that the observer doesn't, he can't add that to the list, even if it might be a rare species flying by. That would be like having two people, a bias. You can't see and count everything, but the goal is to have a consistent, valid year-by-year-by-year set of data so they're compatible."

So, consider working up to the expertise that you'd need to take a BBS route. And remember, even the best are fallible, as Schwalbe and his wife are quick to point out.

"Glenna was with me, on our Cherry Springs route. We went up the night before and slept in the back of the car. We get up at 4:15, grab coffee and cream cheese on bagels and take off. On this route, the first stop out is in the open, the second stop is in deep woods. Driving up to the second stop, something fluttered down onto the dirt road, and it almost looked like a bright green leaf.

"Closer, we saw it was a perfectly solid green bird. Now, there are no bright green birds in North America. We didn't know what it was, and decided it had to be an escaped bird. Next year, we're on our route, and lo and behold, exactly the same thing happened! A bright green bird flew up in our headlights!

"This time, it was a little lighter, and we were able to find out what it was." The retired professor offered a quick biology lesson. "Bird color is produced by pigmentation and feather structure. When the color was reflected back from the incandescent light of the headlights, the true color of the bird became green. Actually, the bird was an Indigo Bunting, a fact we were only able to determine once the bird flew out of our headlights, and into the little bit of natural light so that we could still see it!"

For more information about the Survey, contact Paul Schwalbe at 546 Wilson Street, Jersey Shore, PA 17740.

When is a trend a trend?

What does all this information net us? According to the national coordinators of this project, at Patuxent Wildlife Research Center, in Laurel, Maryland, the survey "provides information, both locally by ecological or political regions and on a continental scale, on 1) short-term population changes that can be correlated with specific weather incidents, 2) recovery periods following catastrophic declines, 3) normal year-to-year variations, 4) long-term population trends, and 5) invasion of exotics.

Translating that into Pennsylvania-specific trends isn't so easy, but by consulting the state-by-state summaries for 1989 and 1990, the biologists completed two-year population trends. They noted, "The repeated theme in this year's analysis of population trends is that of population decline. Declines seemingly cross most geographic and species boundaries, leading us to suspect that the cause was continental in scope and indiscriminate in effect." Short-range declines could have been related to the 1988 drought.

Birds Experiencing a Significant Two-Year Decrease in Pa.

Yellow-Billed Cuckoo
Downy Woodpecker
Eastern Wood-Pewee
Tree Swallow
N. Rough-Winged Swallow
Barn Swallow
Blue Jay
American Crow
Common Raven
White-breasted Nuthatch
House Wren
Wood Thrush
Red-eyed Vireo
Northern Parula
Black-throated Green Warbler
Scarlet Tanager
Rose-breasted Grosbeak
Bobolink
Purple finch

Birds Experiencing a Significant Two-Year Increase in Pa.

Eastern Kingbird
Carolina Wren
Grasshopper Sparrow
Swamp Sparrow

Families, Bats and Surveys Like That

by Connie Mertz

If you haven't yet experienced the joys of bat-watching, you -- and your family -- haven't discovered one of the most entertaining and educational family outings there is.

Babe Ruth achieved fame by his batting average. He set a record of 714 home runs in just one season. Yet, his achievements can't begin to compare to the batting averages of volunteers who work tirelessly in Pennsylvania's Bat Activity Survey.

Walter Bigger, of Trout Run, estimates seeing more than 1,200 bats exiting from a church steeple. He says, "Last year, I was asked to check the church, and I recall reporting approximately 525 bats. I realized there were more; and this year, I drafted some aides. Originally, there were four entrances/exits in the church, but they were also observed exiting along the edges of the roof. This year, our estimates were over 1,200." Quite an impressive batting average!

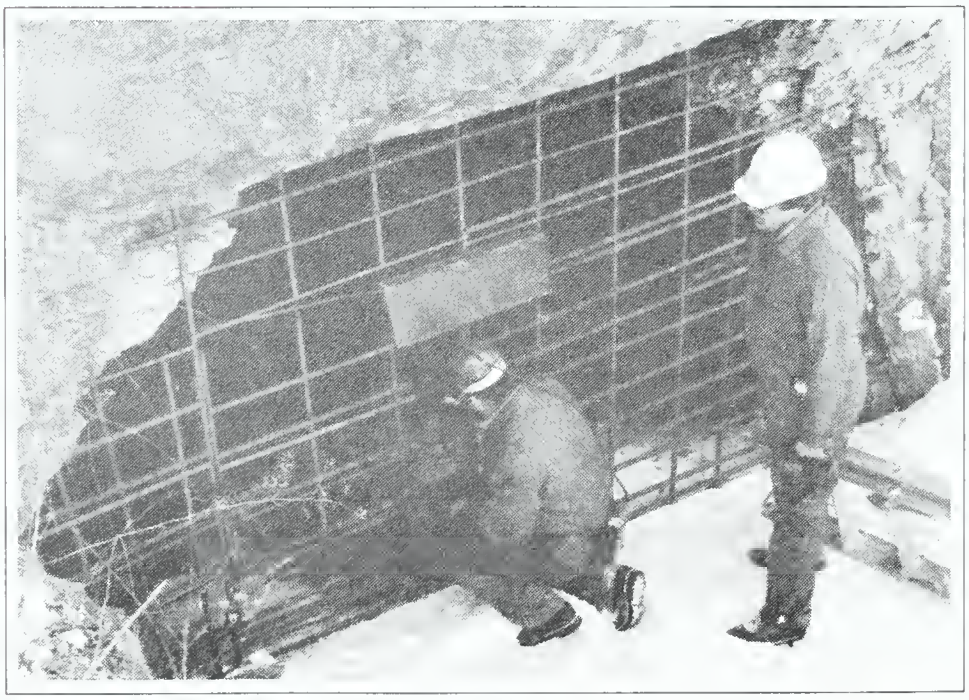
Though Bigger had no prior experience with bats, and just happened to know where a bat colony was located at a local Audubon meeting, Ruth Iski, of Elkins Park, has always been fascinated with small animals. She says, "I always liked the look of fruit bats because they reminded me of Chihuahuas which I bred." Her interest in bats quickly spread to her husband and son, who join her in doing bat surveys.

"My son was eight years old when we started doing the surveys, and he was both fascinated and enthused. He now feels better about bats because he's become better educated." One of the highlights of her son's batting experiences was an evening they were counting bats at Alverthorpe Park spillway. There were many bats flying, and he claimed to have had one touch his knee as it dipped to the water below. That made a lasting impression!"

Iski herself tells of her first batting experience. "It was a beautiful night at Alverthorpe Lake, and I nestled close to the water anticipating the sighting of bats. As darkness set in and the visitors left for the day, the deer came to the water's edge, geese were underfoot, and a raccoon appeared.

"I watched and then waited for my husband and son to return from the other side of the lake. When they came into view, I took one step and tripped over the raccoon that I neglected to see right in front of me. I've never been too fond of raccoons because of rabies, and I went head over heels stumbling to the ground. The raccoon was just as scared as I was. He quickly climbed a nearby tree and chattered. Needless to say, I left just as quickly. We then decided that this spot was not an ideal location for our bat survey."

Iski and her family are truly enjoying their volunteer work. Not only have they witnessed exciting moments while watching the bats in flight, they care enough to be concerned about their future. Iski has



Cave explorers have agreed to gate three Pennsylvania caves that harbor the biggest populations of the rare small-footed bat. Canoe Creek State Park, pictured here, features the best bat cave in the state: It is the only one to provide refuge for all six species of bat that hibernate in this state.

Pa. Game Commission

initiated an educational program in her local school; the two-day workshop focuses on the endangered Indiana bat.

"I was very surprised at the response from the children. They were very receptive." One student commented, "I'm not going to let my Dad shoot bats anymore." Proof that education is the key to better understanding of Pennsylvania's only flying mammals.

Another concern of Iski's is the way bats are displayed at local nature centers and museums. Usually, the bat is portrayed as an ugly mammal. "How they're exhibited can turn kids off to bats." She feels there is a need to improve on the mounts and displays if the bat's image is to be improved. The number-one cause of decline of bats isn't natural predators, but man, who interferes with their life cycles and habitats.

To be involved with the summer bat survey takes a lot of persistence. "Once you locate a survey site, that's 99 percent of the battle," Iski says. This means developing contacts for permission to do a bat survey, visiting the site to determine if bats are present, then actually surveying. What's it like to go batting?

Our family is filled with excitement as we clad ourselves in long pants which we tuck inside our socks. We take a sit-upon blanket, and enough insect repellant to win the war on the nightly mosquitoes. We also include a flashlight and notepad to record any unusual happenings waiting for us this eventful night.

Visiting a local ice cream shop is a must for the kids; batting can be boring for them without something to look forward to. While we're purchasing our desserts, we share with a few acquaintances that we are on a bat outing. Why do they give us such perplexed looks? We're on our way at last, and arrive at the site around 9 p.m. Just as we get situated, we notice it's getting windy and chilly. There are few if any bat sightings. The weatherman has been wrong again! (Excerpts from this were taken from Kelly Griswold's recollections.)

Our second attempt follows the same procedure. The sky is clear, the summer air alive with fireflies. Then suddenly, out of nowhere, a distant roar of thunder is heard. It becomes louder. Retreat is necessary and we run for the car. Another bad night...

The weather cooperates on our third attempt. But where are the bats? They have been sighted here before. Then notice is taken that the mosquitoes aren't bothersome. Ah. No insects, no bats.

Finally, we experience two successful nights of batting. Besides seeing several bats, which builds up momentum, other wildlife comes into view. What a way to spend a perfect evening! Suddenly, it's apparent the bats have flown, and we forgot to count them!

"It has broadened our horizons and changed our views. I'm more critical about the destruction of old houses (where bats may congregate)," says Iski. The Griswold family, disappointed over the number of bats they observed this year, commented, "We never paid much attention to them before we participated in this survey. Now, we're more aware and look for them."

Cal Butchkoski, the Pennsylvania Game Commission's bat specialist who presents numerous bat programs to state parks, admitted that in order to rid people of the fear of bats, "They have got to get to know the bat. Education and understanding their quirks is very important."

Pennsylvania is the first state to initiate a bat summer survey program, and much has already resulted from these findings. For instance, biologists realize that wetlands and forests are essential to this mammal. And 86 percent of all the bats surveyed were counted from rural churches — apparently prime habitat. "These surveys will be a database of bat activity by the end of this century," says Jerry Hassinger, supervisor of the Pennsylvania Game Commission's Endangered and Protected Wildlife Unit. The information gathered will help the Commission as it may consider any management decisions, and the increased awareness and education has already proved successful. Sure there's a way to go, but already in Pennsylvania, fears, misinformation and negativity about bats have fallen like dominoes.

Bruce Bonta

Pa. Game Commission bat specialist Cal Butchkoski introduces youngsters to a bat at Canoe Creek State Park.

It's easy to see that families and bats and surveys like this will result in untold benefits. Not the least important is that through these efforts, bats will continue to be a welcomed guest of the night sky.

For the cavity nesters

by Connie Mertz

The year 1886 has been recorded as the worst year for songbirds. During that year, over five million songbirds were intentionally killed in the United States. Because many of these species were blessed with colorful feathers, the millinery trade reaped untold profits. It is estimated that 400 songbirds were killed each day, the favorite of which was the bluebird.

Not only was the millinery trade in full swing, but the Civil War had ended, and a famine spread through the South. To avoid starvation, people ate birds as well as their eggs. Yes, conservationists raised an outcry, but it was an uphill battle at best. Finally, their efforts were somewhat successful, and songbirds began to recover.

In fact, the bluebird became one of the 50 most common songbirds by 1952. Unfortunately, that spectacle was short-lived. Just when all seemed well, their populations plummeted by 90 percent in 1959. Their habitat was shrinking and pesticides were being widely used. Add to that the harsh winter of 1958-59, and the bluebird was again in trouble. Something had to be done.

Conservationists put their heads together, and came up with a remedy that not only helped the bluebird, but other birds as well: Provide boxes for cavity-nesting bird species. The idea soon caught on, and today many clubs, organizations and conservation groups now erect nesting boxes with marvelous results.

Volunteers enrolled in the "Working Together for Wildlife" program in their cavity-nesting surveys have shown the importance of providing such nesting boxes. In 1989 alone, cooperators monitored a total of 1,564 nesting boxes of 15 different types in 26 counties of the state.

Cavity nesters, as in days of old, are still facing one monumental problem, and it's no secret that it's loss of habitat. But Christine Schaeffer adds a different twist to this dilemma: "The population of house sparrows killed several bluebirds on eggs while trying to invade our boxes! I believe they're moving into cavity boxes because barns, and out-buildings are being torn down."

Then she adds soberly, "Because of habitat destruction for homes, businesses, factories, the bluebird has had a hard time finding natural cavity sites. Farmland is being paved for another shopping center at a growth rate that is unreal! I find it very sad."

The number-one enemy of cavity nesters such as the bluebird and tree swallow seems to be the English sparrow, but Schaeffer found a remedy. She says: "We have a location where we have two cavity nest boxes in a yard of a private home. During our weekly checks, we found that a house sparrow and a pair of tree swallows were fighting over the two boxes. We would remove the house sparrow nest on a weekly basis. Bluebirds were always in the area around the boxes, but the war zone created by the tree swallow vs. the house sparrow kept the bluebirds from building in either box.

"After three weeks of monitoring this battle, we installed a third box. On the heavy-duty garden post were *two* cavity boxes, each facing opposite directions and at different levels. The following week brought the following results: box 1 — tree swallow nest; box 2 — tree swallow nest; box 3 — bluebird nest; and the house sparrows left the area!"

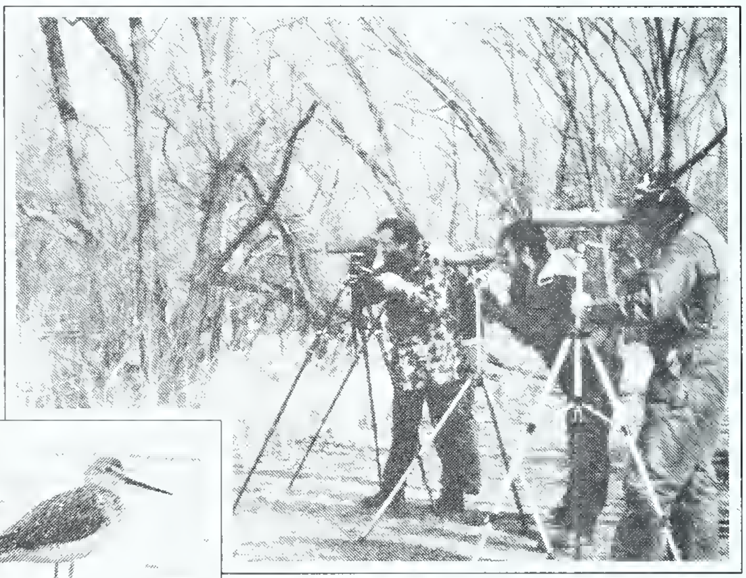
(Continued next page)

For the shorebirds

by Scott Shalaway

It's not surprising that the shorebird project was one of the least popular in Pennsylvania's *Volunteers for Wildlife* program. It ranked ninth out of 11 projects, attracting less than 14 percent of the volunteers.

Maybe it's because most shorebirds are so drably colored. Or maybe it's because they frequent mud flats, a habitat that often sucks the shoes off any human interloper who dares intrude. More likely, though, it's because shorebirds are notoriously difficult to identify, so few people are really qualified to conduct such surveys.



Scott Shalaway

John D. Lutz

Birders are willing to brave almost any weather to pursue the sight of migratory shorebirds, such as the greater yellowlegs (left).

In fact, it was these very negative qualities that attracted Jerry McWilliams, a member of the Presque Isle Audubon Society, to the project. "I like shorebirds because they're so difficult to identify," he says. "I like the challenge."

He proved equal to the challenge from the very beginning when he saw the project's original survey forms. He noticed immediately the list was incomplete and found errors regarding the status of several species on the list. Thanks to the work of McWilliams and 182 other volunteers around the state, those errors are being corrected.

Two or three times each week during the spring and fall migrations, McWilliams and several other volunteers from the Presque Isle Audubon Society census the shorebirds at Gull Point in Presque Isle State Park. On a good day, they may tally unusual species such as whimbrels and western and Baird's sandpipers. Over the course of the year, as many as 22 species of shorebirds pass through Gull Point.

Jerry Book and two other volunteers from the Lancaster Bird Club conduct a similar survey on the Susquehanna River's Conejohela Flats. Book also enjoys the challenge of shorebird identification. He says he does it because, "It's fun."

Results from the Conejohela Flats project suggest that

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Cavity nesters

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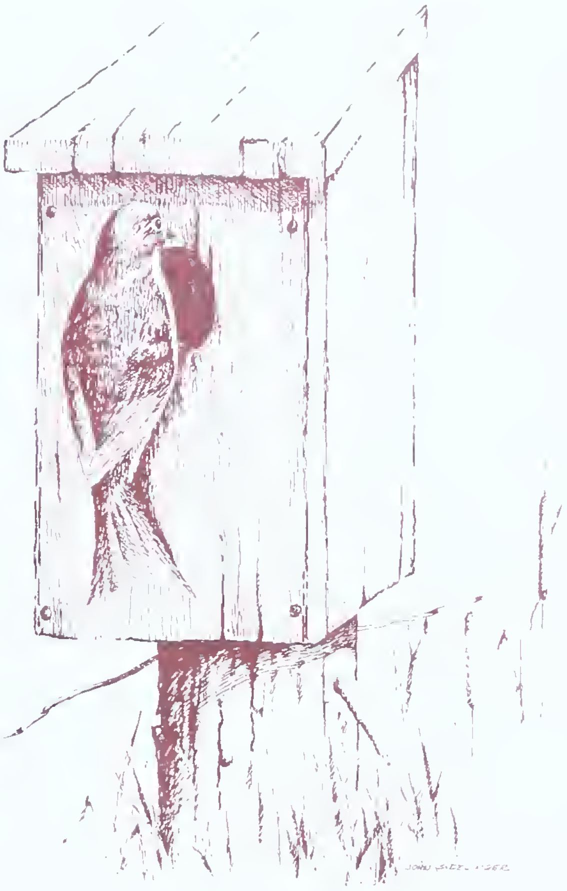
Another factor that resulted in low numbers of fledglings was the cool, damp weather. "We set up feeding trays of mealworms to help the parents. More than 1,000 mealworms were used in the 1990 season," she says.

John Miller is another caring volunteer, who became addicted to birds at an early age. He said he was fortunate enough to live only three blocks from marshes as a child, and he "bumped" into an ornithologist. He was hooked from that point on. He's been observing birds since 1950 as a member of the Delaware Valley Ornithology Club, and has traveled extensively around the world.

Miller puts up 200 tree swallow nesting boxes at the Tinicum National Environmental Center in marsh water of two to three feet deep. He says, "You have to be there to appreciate them. It's intriguing to watch how soon tree swallows use the boxes." He also monitors 24 purple martin boxes along with Daniel Hughes on Glen Mills School property.

As if this isn't time-consuming enough, he also keeps an eye on some shorebirds. Through his observations, he saw the first nesting site of the black-necked stilt in Pennsylvania. This unusual black and white wader is a large bird with long, red legs, and usually breeds further south than the Keystone State.

Another type of nesting box used by cavity nesters is that for the kestrel, especially near farmland where mice are abundant. Don Watts monitors about 46 kestrel boxes which are placed one-half to one mile apart. He estimates that he has banded 90 young kestrels in three years. All told, between 400 to 500 kestrels were banded since 1986. He also likes to catch adult kestrels in live traps during the winter to determine if they migrate. Watts gives a lot of credit to another man, Bill Highhouse (the Birdman of the 1940s and 50s), who introduced him to the kestrel, and set up the nest box trail.



He says, "I've always been an outdoors person and avid birder. This gives me more opportunity to see other birds and expand my birding knowledge. It's a fine substitute for softball."

The surveys are already showing some interesting data. For instance, high bird box use in some habitats (for example, 100 percent use in wetlands) is an indicator of the shortage of valuable natural cavities. In fact, only a small percentage of bird boxes placed by cooperators were located along streams or near wetlands. There are many similar habitat combinations in which to place boxes. Yet, cooperators place boxes in less than 3 percent of the 529 combinations available on their record-keeping form.

Volunteers working with the cavity nesters need to be commended for their countless hours of work. It will be their data that may determine the future of Pennsylvania's cavity nesters. The cavity nesters *are* coming back as individuals statewide strive to provide nesting boxes.

Shorebirds

(Continued from previous page)

the Susquehanna may be more important to migrating shorebirds than anyone ever imagined. "We're finding birds listed as uncommon to rare statewide in much greater numbers than expected. This highlights the importance of the Susquehanna River system as a migration route for shorebirds," he says.

Marbled and Hudsonian godwits, long-billed dowitchers, red-necked pharalopes and buff-breasted sandpipers are among the less common species found on the Flats' annual list that numbers 20 to 22 species per year.

Book's survey has had a tangible conservation payoff, too. Because of interest in the shorebird survey, Book reports that the Flats are now protected by the owners, the Safe Harbor Water Management Corporation. "Safe Harbor executives have been very cooperative and supportive of the project," he says with pride.

The value of volunteer projects should never be underestimated, according to Dr. Gordon Kirkland, professor of biology and Director of the Vertebrate Museum at Shippensburg University. He also advises the Pennsylvania Game Commission on conservation issues. "Population surveys by volunteers are especially valuable for less popular species such as shorebirds and bats," he says.

Because few people seek these critters out, they are poorly understood. Annual surveys by volunteers identify population trends that help alert biologist to ecological problems before they reach the crisis stage.

Though a paid professional, Kirkland also donates his time to state conservation projects. "We can't expect to be paid for everything we do," he says. Perhaps that's why this volunteer program works. It attracts highly motivated volunteers who want to do what they're doing," says Kirkland. Volunteers like Jerry McWilliams and Jerry Book and the 1,327 people who volunteer for Pennsylvania's wildlife.

To learn more about shorebird identification, attend a local Audubon or bird club meeting and meet the resident shorebird expert. Every area has one. Then tag along on the next field trip he or she leads, and learn from the pro.

WRCF: Up against the wall

Question: If you can't hunt it, if it won't bite on a hook, or if you can't walk over it, is it worth anything?

Answer: Ask any one of the almost 100,000 residents who donate their tax overpayments to the Pennsylvania Wild Resource Conservation Fund every year. They will say "yes."

Every single one of us who fills out state income tax forms has seen the line that gives us the chance to donate any tax overpayment to the Pennsylvania Wild Resource Conservation Fund. The line has been on our forms since 1983, when the fund was established to manage and protect the wild resources and habitats that aren't usually given high priority by the state's three natural resource agencies.

The tax check-off is meant to start where the traditional funding of the Pa. Fish Commission, the Pa. Game Commission, and the Pa. Department of Environmental Resources stop. The typical projects funded don't focus on what man can get out of nature. They're more what nature can get back from man...biodiversity inventories, research on endangered or threatened species, public education and awareness, and restoration of species. Ospreys and otters are two of the most glamorous and successful examples of the check-off's ability to restore once-lost species to our state.

But despite some exciting successes, what we, as volunteers, have contributed to the tax check-off has been woefully inadequate. This year, Frank Felbaum, executive director of the Fund, received requests to fund $1/2 million non-game wildlife and natural resource projects, but only $200,000 will be available to fund about half the requests.

It's the worst year ever — a steady decline from the high water-mark of $609,663 in 1986.

Felbaum tells what he believes is the future of Pennsylvania's Wild Resource Conservation Fund.

"As you can imagine, the tax check-off lives or dies by legislative activity. If a competing check-off fund is added, we suffer tremendously. But by the same token, if legislation is ever adopted to help permanently fund the fund, we'll soar like ospreys!

This past legislative year, three pieces of draft legislation looked extremely promising. They were 1) a corporate net income tax check-off; 2) a $1 surcharge on all all-terrain vehicles and snowmobiles; and 3) a voluntary check-off on vehicle registration. With 8 million vehicles registered here, the registration check-off could have generated $400,000 with only five percent of the applicants participating.

The three pieces of legislation are being reviewed to see which would be the most feasible for passage by the General Assembly. Hopefully, there will be enough support by the administration and legislators to have something passed early in this legislative session. I'm now hoping for legislation that might consider a small fraction of one of the state's taxes, such as the real estate transfer tax, the sales tax, or the gasoline tax.

Without it, I'm not sure what our future is. After eight years of the Fund, we have found that we aren't doing more than scratching the surface of the most important natural resource issues.

Volunteers are the backbone. They put the money up, and it is matched by countless hours of time. We're paying minimally for the time put into these two dozen projects. It's the love, the feeling of accomplishments, the success that keep these scientists and professionals at their work. It certainly isn't the funding they get.

I'm sure the money we give Larry Rymon to monitor ospreys barely pays for the gas he uses. But he loves his work, and sees a positive return on his time. You can't put a price tag on that kind of volunteerism. Or Tom Serfass, working on otter restoration — the money expended from this fund versus time spent in the field would compute to $1 an hour for the time he spends on releases and monitoring.

Missouri is the only state in the union to collect 1/8 of one percent of its sales tax for wildlife programs. In 10 years, this produced almost $500 million for land acquisition and habitat maintenance. Can you imagine the work we could do with that money?"

A thorough review of the issues confronting the financing of the Wild Resource Conservation Fund can be obtained by requesting Research Monograph No. 8 (May 1990) from the Joint Legislative Air and Water Pollution Control and Conservation Committee of the Commonwealth of Pennsylvania, Box 254, Main Capitol Building, Harrisburg, PA 17120-0028.

Looking for martins

If you took part in the Volunteers for Wildlife "Creating a Purple Martin Trail" program, you probably know the answer to this question: *What does it take to attract a purple martin?*

You probably know the answer because you knew exactly where to look to complete the assignment. Your job was to find ten purple martin houses, and monitor their use by the beautiful insect-eating birds.

You looked for martin condominiums 50 feet away from any buildings or trees (to allow a long enough aerial runway). You knew to confine your search to areas 100 feet from houses or barns because martins prefer to be near human activity. You determined that the apartments indeed held martins, not sparrows or starlings, the martin's worst nest-site competitors. And you knew not to bother looking for any natural cavity activity because martins are the only bird species in eastern North America totally dependent on human-supplied nest boxes.

And you might also have known that this Volunteers for Wildlife assignment would have been a lot easier before 1972. That was the year Hurricane Agnes rumbled through Pennsylvania. Besides the human lives lost and property damage it rained on us, the hurricane came close to spelling avian genocide for the purple martins.

"In 1972, it rained three weeks straight, and killed the entire crop of babies and parents. There were no flying insects, so the birds succumbed to starving, drowning and hypothermia," says James R. Hill, III, executive director of the Purple Martin Conservation Association, a national organization based in Edinboro, Pa.

"The following year, few martins returned here to breed. When it took several years for martins to come back, house sparrows took over the houses, and a whole lot of historical martin colony sites have never been reinhabited," says Hill.

Tenacious landlords didn't give up, and new housing sites started near the old colonies. But attracting martins to an unestablished site takes a lot of hard work, Hill says. "Our organization has been studying ways to increase the ability to attract them. We have cassette tapes of purple martin dawn songs, which are how older males attract the young birds in." If you play the tape during migration, you can attract purple martins to an unestablished site.

"Like a garden, you have to put time into martin house management to succeed. You have to lower the house often to keep it clean. If you let one tree swallow, bluebird, or crested flycatcher get to the house first, they will set up a territory. If a martin should stop by, they'll be chased away," says the association's executive director.

Hill says Pennsylvanians are nuts for martins, and because of their hard work in the last two decades, the martin story deserves as much celebration as the success of the bluebirds' return in the Keystone State.

"You can say that martins now breed in every county of the state, and you can find them in many blocks of the Pennsylvania Breeding Bird Atlas," says Hill. The Atlas maps possible, probable and confirmed sites of breeding birds in the state.

Look for a fairly heavy concentration of these largest members of the swallow family in the northwest corner of the state. Farther south, around Pittsburgh, they're sparse. Southwestern Pennsy is pretty solid, but it breaks up along the Appalachian Ridge and Valley slopes across the center of state. That's because martins avoid heavily forested and mountainous areas. From about State College south east, where farmland is more prevalent, martin activity increases again. Lancaster County is almost entirely solid. There's a peppering in the northeast.

It's in the northwestern part of the state that Hill believes is a record for the most purple martin apartments in a single location. "We have 125 pairs at PMCA's research grounds in Edinboro," Hill says. The next largest colony we know of in the state is at Heisler's Dairy Bar, outside Tamaqua, Pa., in Schuylkill County.

Pearl Heisler, owner of the dairy bar, says she and her late husband bought their first purple martin house 15 years ago. "But now we build our own, and it's quite a job to do it, they cost $250 a piece."

(Continued on back cover)

Only thick skins, clogged noses and big hearts need apply

Have you ever felt the soft leather of an immature beaver's tail? Or, when you were a kid, did you ever try to eye-dropper-feed the broken-winged bird that dive-bombed your picture window? Lay a bottle of hot water next to an orphaned baby chipmunk? And did you get at least a little choked up when it died in the middle of the night?

Those are the "touchy-feely" emotions that it's important to have when considering volunteer work with a licensed animal rehabilitator: The chance to stare a bald eagle right into its golden eyes, the right to hear the perfect screech of a red-tailed hawk warning you from only five feet away, the electric thrill to touch a wolf.

Now wake up, troops, and smell the coffee! Or, as Hope Carpenter might put it bluntly, smell the flight cage and the intensive care crate. Oh, you might enjoy having a raccoon snuggle you but, if you are truly a dedicated volunteer, it will be while you're stooped over, adroitly handling your pooper-scooper. A sharp-shin may be dive-bombing you, but you won't have time to notice, you've got to get the holes in the flight cage patched up.

So as not to completely discourage you away from working with wounded and abandoned wild animals, know that the expert rehabilitator you work for may give you one or two of the glamour jobs, like bottle-feeding a wild fox kit. But if it's feeding chores you'd like, you could just as easily be defrosting the white lab rats, dragging in the carcass of a roadkilled deer, or possibly more distasteful, sentencing live prey to death in a bobcat pen. Accept it as your chance to see a true predator-prey relationship.

There are 47 licensed rehabilitators in the state, and every single one either uses or needs volunteer help. But make no mistake, what they need are the most dedicated people out there — those of us willing to do the scut work.

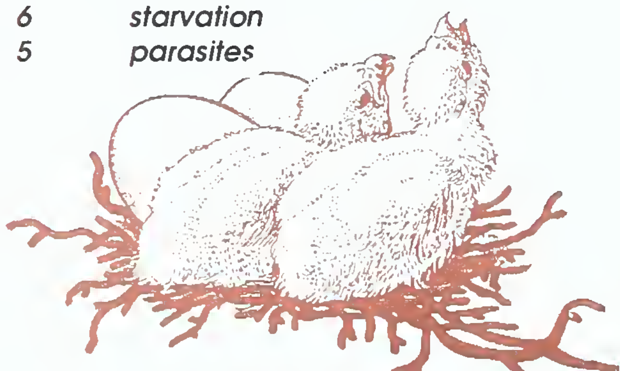
Licensed rehabilitators don't have it any easier. "We can't just rehabilitate part time," says Hope Carpenter, one of the most well-known and outspoken rehabbers in the state. "If I can't get up at 4 a.m. to give fluids to the long-eared owl that got hit by a car last night, then I really can't properly do this job."

Carpenter admits bluntly that she needs the backbone of a volunteer force to help maintain her center in Mount Bethel, near Stroudsburg, Pa. "I need ten people who will come here one day a month for two hours, and not quit after we invested a full day training them. And they can't expect social contact." That means that they can't come in and jaw over a pot of coffee about the antics of an orphaned porcupine, or any of the dozens of recuperating and resident raptors. That means that they won't expect thank-yous from either the straight-talking Carpenter or her charges. "Wildlife never says thank you. In fact, when you release it, it probably will bite you on the way out the door. That's okay by me. But if you're coming here to be thanked, then don't."

Hold your nose and then decide if it's a job you can take. "I'll tell you this honestly. 90 percent of rehabilitation is cleaning up feces. Playing with an animal, or loving it is not doing it any good. And that's where we run into some crazy motivations," she says. You want to cuddle critters, buy yourself a passel of stuffed toy look-alikes.

Why birds and mammals meet rehabbers*

447	nestlings in trouble
88	impact or collision
87	human disturbance of nestlings
80	unknown cause
61	injured by other wildlife
49	poisoning
27	armed projectile
17	relocation of problem bird/animal
13	hypothermia, caused by exposure
10	trapped, unable to escape
7	disease
6	leg-hold traps
6	starvation
5	parasites



*Based on the 1986 Annual Report of the Pennsylvania Raptor and Wildlife Association.

Rehabilitators say their volunteers come from all walks of life — suit-and-tie professionals who have a "need" to get their hands dirty, students who are trying to shape their own life goals, retirees who aren't ready to stop working.

James Beard, assistant director of the Pa. Game Commission's Bureau of Law Enforcement, the agency that oversees our state's rehabbing efforts, praises the cadre of volunteers who work for the licensed rehabilitators. "They do serve a very good purpose. The expertise lies with the rehabber. But those doing the volunteer type of work don't require that level of expertise. And this allows the rehabilitators to spend their time on actual rehabilitation work." It's an important partnership.

And as in the case of Ed and Tink Reish, what started as a purely volunteer wish-to-help turned into an "internship," leading eventually to their licensing as rehabilitators themselves.

If you aren't already scared away from volunteering, here's the icing that will do in most of you. In the grand, global scheme, your energy and your dedication won't mean a whit. Carpenter sums it up the most gentle way she knows: "You really want to work for wildlife? Volunteer at Planned Parenthood."

Huh? She patiently explains. "The most serious problem wildlife faces today is the overpopulation of humans. The more there are, the more they degrade the habitat. And as long as we continue building homes, roads, shopping malls — what used to be home for these wild animals — it just won't matter how many animals I fix." They, or their offspring, just won't have any place to live.

"By our work, we are not changing population dynamics at all," she says of wildlife rehabilitation. "The number of each species we put back into the wild is not large. It's finger in the dike work."

Then, the big question is why. Carpenter has a ready answer. "I'm doing this to leave the earth a better place than I found it. The natural selection of all life as it operated at one time has become so skewed by our being here. Wildlife still succumbs to selection, but it's not natural, it's incidental. If I can, by my work, I'd like to reduce that by

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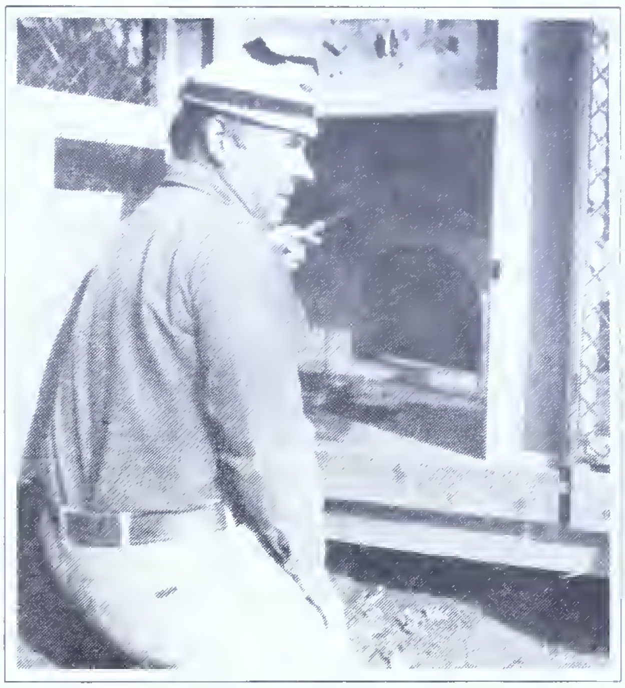
Big-ticket rehab: the bobcat

Karl J. Lutz



Wildlife rehabilitation work is almost always back-breaking and pain-staking. But for the chance to experience nature at its best, some volunteers, like Ed Reish, may agree nothing offers better rewards.

September 12, 1990 was a bad-luck day for one of Pennsylvania's bobcats. That's the day an eight-month-old kitten got both hind legs broken when a car hit him on Warrensville Road in Lycoming County. It also turned out to be a good-luck day for the cat. Actually, it was a typical day in Pennsylvania, when volunteers banded together and got a costly but beautiful job done.

Two severe fractures, one on each hind leg, caused at least one decision-maker to recommend the bobcat be put out of its misery. But Wildlife Conservation Officer Dan Marks took the cat to Ed Reish, a volunteer licensed rehabilitator in Montoursville, and that started the clock on Ed's four-month involvement with the cat.

"I talked to the Loyalsock Animal Hospital, and as usual, they were willing to help out. We knew the operations to reset the bones would be tricky, so they made arrangements with the University of Pennsylvania's School of Veterinary Medicine. The doctors there settled for doing the surgery for just the costs of the materials! They took about $250 for a normally $2,000 operation.

"I had to find money fast. When I called the Lycoming Audubon Society, they agreed without hesitation," Reish said. But as it turns out, you and I — taxpayers who contribute our tax overpayment to the state's Wild Resource Conservation Fund — bought that cat a second chance. The $250 was paid by the "tax check-off fund."

After the operation, the cat was dangerously underweight, and for three days after the surgery, wouldn't eat "even the high-priced cat food" Reish and his wife Tink put out. Its predatory instincts had already been forged, and even with two mending legs, it needed to take down its own dinner. Reish knew that unless he found a way to give the cat his medicine and some food, all the doctoring would be for naught.

Live prey injected with the needed antibiotics served as the perfect main course. "There's nothing wrong with this cat's instincts; apparently it had a lot of training from its parent," Reish said.

The compound fracture of the cat's tibia required the insertion of a temporary plate and holding pins which had to be removed in a second operation before the cat was returned to the wild. The doctors believed that leaving the plate in would conduct too much cold, and would cause the cat to suffer during winter months. By now, the cat will have returned to the wild in northcentral Pennsylvania.

Tallying up the hours, dollars and materials for this one cat would make an astounding bill. But one of the four doctors who operate Loyalsock Animal Hospital perfectly described the sentiment of he and his colleagues, who all took part in helping the cat at no cost. "We didn't charge a thing. At some point in time, you make a commitment to give something back to wildlife, to the species that can't help themselves and don't have anybody else to help them. Wildlife everybody owns, and it should be a community effort for us to give something back to nature."

The investment in this cat isn't just for months, it's for years, and maybe even decades, to come. "This particular bobcat is young, has a long life of potential ahead of it, and because of its reproductive abilities, it can be spawning generations of a wildlife species that we want to see come back into the area," says Dr. Tom Knoebel.

Sentiment like that makes the return well worth the investment.

Thick skins

(Continued from previous page)

just a little. If I stop doing this, no one else will."

What rehabbers do is, yes, repair broken wings, patch pesticide poisoning, and raise orphans. But what is even more critical is the educational responsibility that rehabilitators shoulder. When they take an owl into an elementary school, it is there that they may touch one child, who just might grow up differently because he has seen the beauty in a feather.

And when the incomprehensibly ignorant urbanite calls up and says, "Get *your* skunk out the back yard of our weekend cabin," it is the rehabber's strength to explain that the skunk really does have squatters' rights, and will rid you of pesky grubs in the bargain. If they can change just one of the 100 callers they get, they can sleep a little easier at night.

So, look at it this way, potential volunteer. Now you know that all you can offer is to clean up cages, and it really won't change much anyway. But if you understood anything of what Carpenter says, you have a conscience for the planet, too. And, in the end, you will know in your heart that the littlest thing you have done will somehow, somewhere, in some small way, make a difference.

Eagles on the move

by Mike Kelly

According to the results of Midwinter Bald Eagle Surveys from 1986 to 1990, sightings of bald eagles have steadily increased in Pennsylvania. Consider. In 1989, a total of 45 sightings were reported, and in January 1990, 64 bald eagles were sighted. This increase in sightings is a good indication of increases in actual populations — good news for wildlife enthusiasts!

The bald eagle surveys are compiled by the Pennsylvania Game Commission as part of a larger survey coordinated by the National Wildlife Federation, with input from more than 80 volunteer observers across the state. Volunteers range from individual birders to members of the Army Corps of Engineers.

Bob Schutsky is one such volunteer who's been participating in bird counts since 1976. Urged by a friend to become involved in bird surveys, Schutsky grabbed a couple maps of his home area, Lancaster County, and organized a group to participate in an annual Christmas Bird Count. Schutsky and his volunteer team are part of the network of the National Audubon Society Bird Count, the largest volunteer data collection effort in North America.

That was 14 years ago. Because the information is gathered every year, Schutsky has been able to make some observations about trends in his area. One of the brightest spots is the drastic increase in the number of bald eagles.

Schutsky attributes this increase to the elimination of harmful pesticides, effective public education campaigns and successful re-introduction efforts by agencies such as the Game Commission.

But volunteering for the benefit of birds, and eagles in particular, need not necessitate your huddling in the snow-covered woods on the day after Christmas. Philadelphia Electric Co. owns several islands in the Susquehanna River at Muddy Run in Lancaster County. According to Chotty Ault, coordinator of environmental projects at the electric company's Muddy Run Recreation Park, bald eagles were spotted building a nest in 1989 on one of the PE-owned islands.

PE also leases land on this island to cabin owners who reside there during the warmer months. Because incubating bald eagles are especially sensitive to the presence of humans near their nests, PE called together members of the Game

One of the most exciting successes in wildlife reintroductions in Pennsylvania has been the Game Commission's bald eagle program. Improved habitat and the marriage of professional and volunteer commitment have resulted in our national symbol's return to the Keystone State.

Pa. Game Commission

Commission, the Fish Commission, and the cabin owners to discuss a plan that would assure the eagles' privacy. As a result of the meeting, cabin owners agreed to stay off the island through Memorial Day when the eaglets would be out of danger.

By not pursuing the enjoyment of their island getaways, these cabin owners donated their time for the benefit of a future generation of eagles.

In the process, the islanders developed a deep appreciation and fondness for the eagle family. After returning to the island, several folks continued a vigil to monitor progress of the fledgling eaglets.

In the end, all were rewarded when two eaglets fledged from the nest. As an added reward for their unique contribution to the bald eagles, the Game Commission presented the cabin owners with t-shirts and certificates signifying that they were truly "working together for wildlife."

For those interested in learning about and observing bald eagles at the Muddy Run Recreation Park, Philadelphia Electric sponsors eagle awareness days. For directions or information, call Muddy Run at 717-284-2538.

Patriotism and bald eagles have always flown together, as depicted in this still timely 1942 Game News cover. Those years were especially important to bald eagles in Pennsylvania, for it was in 1939 that Mt. Johnson Island, in the Susquehanna River, was named the first sanctuary for eagles in the world.

Pa. Game Commission

On eagles

Although bald eagles have long nested in Pennsylvania, before 1988, all of them were found in Crawford County. So, just about the only bald eagle you were likely to see in the Keystone State was found on the b-side of a quarter dollar, or even more rarely, flanking a half-dollar coin.

Today, thanks to the efforts of volunteers and professionals, bald eagles can be found in Butler, Tioga, Dauphin, Lancaster and Crawford counties.

The Pennsylvania Game Commission began a seven-year reintroduction program in 1983, when they brought the first of almost 100 eaglets from Canada.

The birds grew up here, in man-made nests, while Game Commission personnel tried to convince the birds to eventually set up nests here.

It's a tough life for a bald eagle. The young birds leave the nest after 10 to 12 weeks, and don't reach sexual maturity until they're four or five years old. It's been reported that only one of every ten reaches sexual maturity.

Until reaching maturity, bald eagles have a dark brown head and tail, with dark brown mottling through their wings and tail. It's easy to confuse an immature bald eagle with a golden eagle. If you're not sure, remember that adult goldens are nearly uniformly dark without any of the white mottling found on immature balds. Immature goldens have white wing patches and a white band at the base of the tail.

You may be most likely to catch a glimpse of a bald eagle during the colder months when it has returned to Pennsylvania from summer range farther north.

88 people who conducted bald eagle surveys for the Game Commission in 1990 scouted between January 6 and 16th, and found the most eagles in Lancaster County, along the Susquehanna River; in Crawford County, at Pymatuning Lake; and along the upper Delaware River.

So, if you're pondering a post-holiday wildlife pick-me-up, consider eagle-watching, and liven up an otherwise quiet month!

Looking for martins

(Continued from page 11)

If you used this ice cream stand for your *Volunteers for Wildlife* project, you know that this purple martin colony is a choice location — a dozen homemade martin houses, for a total of 192 separate apartments. "We have them on 40-foot-poles, which we take down each year. Martins won't go in a dirty house. When we do put them back, we keep cups in the holes until the birds get organized," Heisler says.

That's a good practice for discouraging competing species, Hill says. But it works only if the martins are returning breeders. "You can't do that the first year you attempt to attract martins because, with the holes closed, they won't recognize it as a potential breeding site."

Heisler says she can't count all the birds, but her registration form indicates an estimate of 100 nesting pairs last season.

If you want to enjoy purple martins, consider it the ultimate challenge to the backyard bird enthusiast, and proceed with energy and patience. Together, the Pennsylvania Wild Resource Conservation Fund and Pennsylvania Game Commission offer plans for making your own purple martin house, and helpful tips about attracting the birds and keeping them healthy (i.e., sawdust and powdered sulphur in each compartment holds down lice and red mites).

Woodworking for Wildlife is a handy manual of nest boxes for a wide variety of birds and mammals. Contact the Pennsylvania Game Commission, 2001 Elmerton Avenue, Harrisburg, PA 17110-9797 to request a copy. For information on attracting purple martins, or to register your colony, write to James Hill, III at the Purple Martin Conservation Association, Edinboro University of Pennsylvania, Edinboro, PA 16444, or call 814-734-4420.

VOLUNTEER NETWORK NEWS

Published as a cooperative venture of the

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Coordinators:
Jerry Hassinger, Pennsylvania Game Commission
Walter Pomeroy, National Audubon Society
Frank Felbaum, Wild Resource Conservation Fund
Editor:
Julie Lalo
Writers:
Jerry Hassinger
Mike Kelly
Julie Lalo
Connie Mertz

Scott Shalaway

For more information about participating in the ***Volunteers for Wildlife*** program, or for additional copies of this newsletter, contact any of the three organizations listed above.

Like lone wolves in the night, volunteers go about their work quietly, secretly, shying away from attention. Without the millions of dollars and millions of hours they contribute, our wildlife and natural resources would be much the poorer.

Thank the men, women and children who work for wildlife. The following list is but a small sample of the organized and individual efforts in Pennsylvania which are devoted to protecting some of our most precious resources.

Pennsylvania Game Commission deputies
Pennsylvania Fish Commission deputies
Adopt-a-Stream cooperators
Project Wild participants
Project Aquatic Wild participants
Monitors of the Dept. of Environmental Resources
Bluebird trails
Volunteers In (Pennsylvania State) Parks
National Forest Service volunteers
Pennsylvania Biological Survey volunteers
Schoolteachers who work overtime to instill a nature ethic in their students
Breeding Bird Trend Survey volunteers
Sierra Club members
National Audubon Society chapter members
Members and activists of local and statewide conservancies
Future Farmers of America
Members of Pa. Wildlife Federation & National Wildlife Federation
Affiliates of Pa. Federation of Sportsmen's Clubs
The Telephone Pioneers of America
Teachers in the Hunter Safety Program
Volunteers who monitor for stream and river quality
Volunteers and staff of nature centers and wildlife sanctuaries
Rehabilitators and their supporters
Participants in the Christmas Bird Count
Participants in the Breeding Bird Census
Aides who assist professional researchers
Individuals who pick up litter while out-of-doors
Environmental activists who lobby to protect habitat
Taxpayers who contribute their overpayment to the Wild Resource Conservation Fund
Members of garden clubs
4-H club members, Boy Scouts, Girl Scouts

Value the volunteers! Nature needs them!

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KEYSTONE WILD NOTES

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FALL 1992

WOOD THRUSH IN A FRAGMENTED PENNSYLVANIA FOREST

by
Jeff Hoover
Project Assistant

Wood Thrush (Hylocichla mustelina)

The flutelike "ee-o-lay" song and the rapid "pip-pip-pip-pip" call of the Wood Thrush (*Hylocichla mustelina*) is becoming less common in the deciduous forests of the eastern United States. According to the Pennsylvania Breeding Bird Survey, the number of wood thrush has been decreasing at an annual rate of 4 percent since the late 1970's. A forest songbird research project, which has been sponsored in part by the Pennsylvania Wild Resource Conservation Fund, Pennsylvania State University and Hawk Mountain Sanctuary Association, was designed to examine one of the potential causes of wood thrush decline, the fragmentation of its breeding habitat in Pennsylvania.

Background

Wood thrush are commonly found in contiguous forests and woodlots throughout Pennsylvania. They are classified as forest-dwelling neotropical migrants, because they breed in deciduous forests of eastern United States and southeastern Canada, and winter in the neotropics from Mexico to Panama. During the last week of April wood thrush begin to return to the forests in Pennsylvania with the males arriving first to establish territories. The females arrive one to two weeks later and breeding activity begins. An open cup-shaped nest is built by the female and is often placed in shrubs and small trees within the forest.

Forest fragmentation poses several problems for forest songbirds. One obvious problem is loss of habitat (Fig. 1). Another problem is the increase in edge habitat that results from forest fragmentation. As areas of forest become smaller, the amount of edge habitat increases proportionately. Also, narrow forest fragments have more edge than wide fragments. Historically, edge habitat is thought of as beneficial to wildlife because a wide variety of species use forest edges. However, an increase in edge is often detrimental to forest songbirds because it results in an increase in the failure of these songbirds to reproduce successfully. Brood parasitism and nest depredation are primary

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DOCUMENTS SECTION

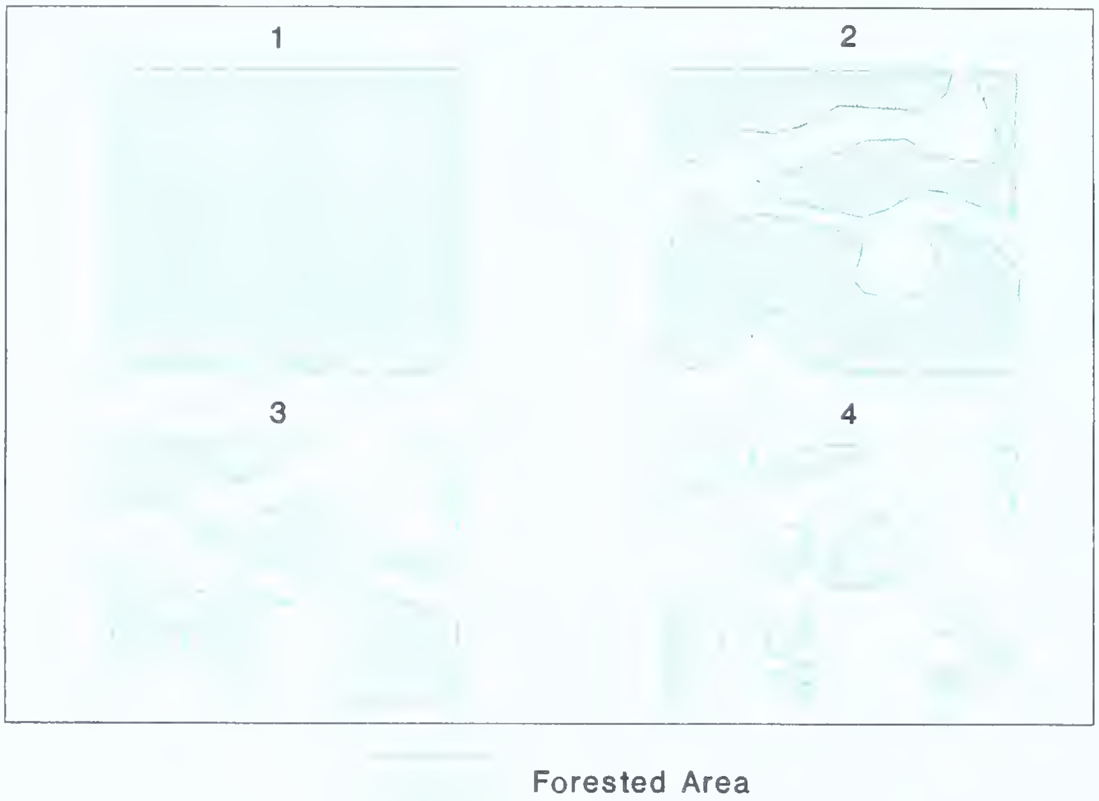


Figure 1. *An area that is entirely forested (1) becomes fragmented over time (2, 3) and results in small isolated forest fragments (4).*

causes of forest songbird nesting failure.

The mixture of forest and open land which results from forest fragmentation is a prime habitat for several species of nest predators. In areas where there is little forest and a lot of open land, the brown-headed cowbird (*Molothrus ater*) commonly lay their own eggs in the nests of other species (a host species) and let the host raise the cowbird young. This "brood parasitism" is detrimental to forest songbirds because the female cowbird will often remove some of the host species eggs from the nest. Also, cowbird young are often larger and more aggressive than the host young and get more of the food brought to the nest by the adults. Edge habitats also make songbirds nests vulnerable to predation by other birds, mammals and snakes. Birds that nest closer to the edge of the forest have their nest preyed on more frequently than birds that nest in the interior of the forest. As forest habitat is fragmented, the population of edge to interior increases, sometimes to a point where the remaining forest could be classified as all edge habitat. A forest patch that has little or no area far away from an edge (interior) would likely have low nesting success.

PA Project Design

During the summers of 1990 and 1991, a total of 171 wood thrush nests were monitored. These nests were found on nine privately owned woodlots in Berks County ranging in size from 25-300 acres and on two areas of the contiguous (>10,000 acres) forest at Hawk Mountain Sanctuary. These woodlots are the areas of forest that remained after the land was cleared for agricultural and suburban development and isolated from other forested areas by agriculture, suburban development and highways. Nest success, nest depredation and brood parasitism were compared between small (<200 acres) and large (>250 acres) areas of forest. Nest success was also compared over the range of forest areas.

Findings

Seventy-five wood thrush nests were found on large forest areas and 96 on small. On the large areas of forest 76 percent of the nests were successful compared to 43 percent success on small forest areas (Fig. 2). The primary cause of nest failure was nest depredation. Only 19 percent of the nests in large areas of forest were preyed on compared to 56% on small. Brood parasitism by the brown-headed cowbird differed between the large and small areas of forest, as 4 percent and 13 percent of the nests were parasitized respectively. However, parasitism did not cause total nest failure in any of the nests. The probability of nest success increased as the size of the forest increased (Fig. 3).

Predation on wood thrush nests was highest on the smaller forest patches and caused nearly all nest failures (93 percent). On four occasions common grackles (*Quiscalus quiscula*) were observed preying on wood thrush nests. These were the only times that actual predation was seen. Other potential nest predators include the blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), raccoon (*Procyon lotor*), opossum (*Didelphis marsupialis*), house cat, eastern chipmunk (*Tamius striatus*), and black rat snake (*Elaphe obsoleta obsoleta*). The abundance of avian nest predators was higher on the small forest patches where wood thrush nest success was low. The abundance of mammalian nest predators was determined by using a scent-sign-post survey where animals approach a scent-post to

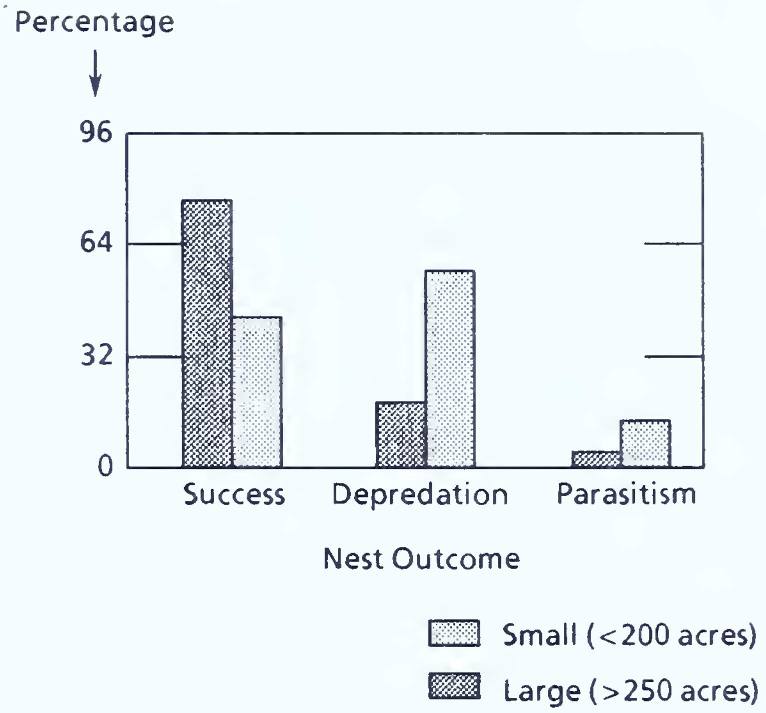


Figure 2. *Comparison of success, depredation, and brood parasitism of 171 wood thrush nests on large and small areas of forest in Berks County, Pennsylvania, 1990-1991.*

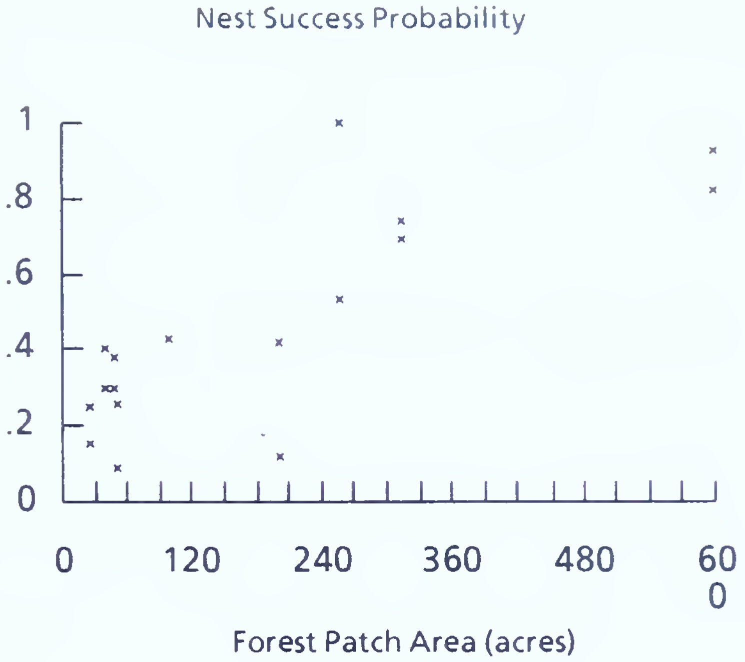


Figure 3. *Comparison of wood thrush nest success probability and forest patch size for nests found in Berks County, Pennsylvania, 1990-1991.*

investigate the odor and leave tracks on the ground around the post. Mammalian nest predators visited the scent-posts more often on small forest patches than on large areas of forests.

Surprisingly, cowbird parasitism showed little influence on the nesting success of wood thrush in the areas studied. In the Midwest, brood parasitism has much more of a negative influence on reproductive success. Rates of parasitism can reach levels of 80 percent and higher in parts of the Midwest, and often there are a multiple number of cowbird eggs per parasitized nest. In some cases, songbirds raise a brood of cowbirds and none of their own. This difference between regions is likely due to the higher number of cowbirds present in the Midwest and the fact that many parts of the Midwest are primarily open land with little forest area. However, the influence of brood parasitism may increase in Pennsylvania if areas of forest continue to be fragmented.

Conclusions

In Pennsylvania, forest fragmentation has resulted in a landscape of forest patches interspersed with agriculture and suburban development. Wood thrush still use these forest patches as breeding habitat, but they are not nearly as successful as those that breed on the larger areas of forest. If habitat quality were to be determined based on presence of wood thrush alone, then the forest patches would be quality habitat. However, the reproductive success of the birds is what contributes to the population each year, and should be included in any determination of habitat quality. With reproductive success included in the definition of quality habitat, extensive areas of forest and large forest patches are much better habitat for the wood thrush and are important for the continued existence of the species.

Pennsylvania is fortunate in that it has some vast areas of forest still remaining. However, the threat of development and continued expansion into our forests still exists. In looking at the results of this research, it is apparent that large areas of forest are important to the reproductive success of the wood thrush and other forest songbirds. Forest management practices that maximize the amount of forest interior are also important. In other words, big is better than small, and wide is better than narrow. By maintaining large areas of forest that have a lot of interior, not only are we helping the wood thrush, but we are helping several species of forest dwelling songbirds that add motion, color and song to our Pennsylvania forests.

con't...

Wood Thrush con't...

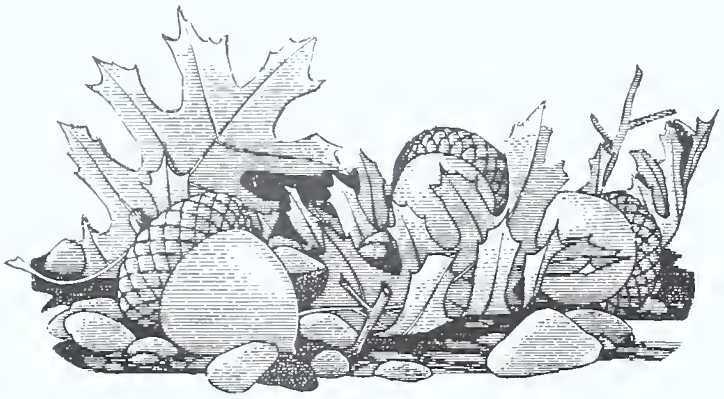
Figure 2 bar graph:

	Large	Small
Success	76%	43%
Depredation	19%	56%
Parasitism	4%	13%

Figure 3 trend graph:

X	Y	LOG10X
25	0.25	1.38
25	0.15	1.38
40	0.40	1.60
40	0.30	1.60
47	0.30	1.67
47	0.38	1.67
50	0.09	1.70
50	0.26	1.70
100	0.43	2.00
200	0.12	2.30
200	0.42	2.30
257	1.00	2.41
257	0.53	2.41
315	0.69	2.50
315	0.74	2.50
600	0.82	2.78
600	0.93	2.78

For this trend graph, the X column is given in acres. If your graphics can produce a logarithmic X axis, like my graphic, then you can just enter the acreage. If not, I have provided the Log_{10} for all of the acreage numbers.



ATLAS OF BREEDING BIRDS IN PENNSYLVANIA

by

Daniel W. Brauning, Editor

The most comprehensive survey of Pennsylvania's nesting birds ever undertaken, the *Atlas of Breeding Birds in Pennsylvania* is an illustrated, easy-to-use reference that locates and profiles all 203 species of birds that are known to have nested in Pennsylvania. The atlas is the result of a statewide survey conducted from 1983 through 1989 by more than 2,000 volunteer birders. Illustrations, 190 two-color maps and extensive tabular data make this a major resource that will be consulted for years to come.

Large easy-to-read maps form the core of the atlas. The maps are supplemented by a tabular summary of the results of the survey and, where sufficient data exists, a graph that shows population trends from 1966 through 1987. Seven acetate overlays showing the state's ecozones, elevations, mean temperatures, precipitation, forest types, land cover and river systems accompany the maps.

An authoritative species account that describes historical changes in populations, habitat requirements and nesting biology faces each map page and summarizes and analyzes the survey results. The illustrations accompanying each account frequently depict one of the nesting behaviors associated with the species.

The scope of the atlas is further enhanced by comprehensive appendices which include authoritative accounts of species previously known to nest in Pennsylvania and a summary of nesting season chronology for each species. The bibliography of over 1,000 entries is a major resource in itself.

This project and publication has been in part financially supported by the PA Wild Resource Conservation Fund, the Commonwealth income tax checkoff system.

The atlas will be invaluable to any bird enthusiast who lives or vacations in Pennsylvania and surrounding states. Professional ornithologists, ecologists, and other environmental and wildlife specialists will find the atlas essential, as will engineering consultants, regional planners, landscape architects, and others whose activities affect the environment.

For further information and orders, contact:

University of Pittsburgh Press
c/o Cup Services
Box 6525
Ithaca, NY 14851

The cost of the publication is $34.95 plus a $3.00 postage and handling fee.

The publication will be available for the 1992 Holiday season.

WRCF PROJECT UPDATE

Amphibians and Reptiles Book Available

Another project funded by the Wild Resource Conservation Board has been published. The new book, titled *Pennsylvania Amphibians and Reptiles* is a comprehensive field guide to the 76 species of amphibians and reptiles in Pennsylvania. The combined efforts of the Pennsylvania Fish and Boat Commission, and Pennsylvania Wild Resource Conservation Fund (Pennsylvania's income tax checkoff) made this publication the state's first complete guide to these interesting creatures. The natural history of the salamanders, frogs, toads, turtles, lizards and snakes is presented in a style easily understood by everyone.

Pennsylvania Amphibians and Reptiles includes complete descriptions and is an effective aid in species identification. Maps showing the range in Pennsylvania of each species are included, and the book is profusely illustrated with beautiful, full-color artwork and color photographs. Additional sketches provide close-up detail of many identifying characteristics.

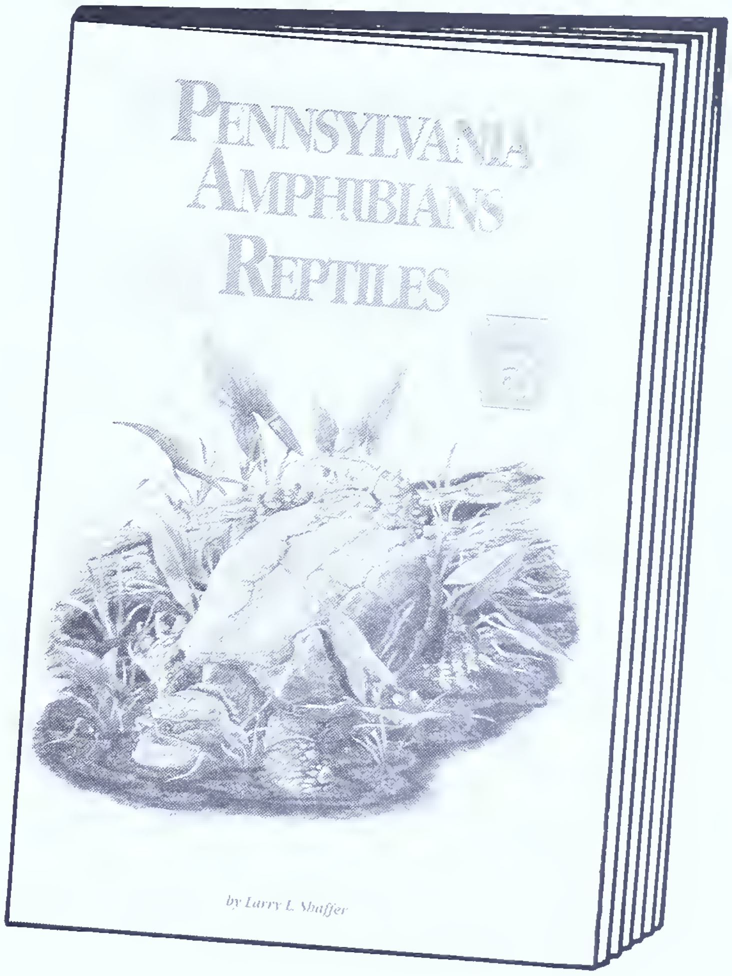
Included in the 168-page book is a chapter providing information arranged alphabetically by subject matter. A complete glossary of important terms is also included. Students, educators, outdoorsmen and anyone interested in learning about Pennsylvania's amphibians and reptiles will find this book a useful tool.

For a $20.00 contribution to the Wild Resource Conservation Fund, we will send you a copy of *Pennsylvania Amphibians and Reptiles.* For a $25.00 contribution, we will send you "Annotated List of the Birds of Pennsylvania" and *Pennsylvania Amphibians and Reptiles.*

Please send contributions to:

Wild Resource Conservation Fund
Box 1467 PL
Harrisburg, PA 17105

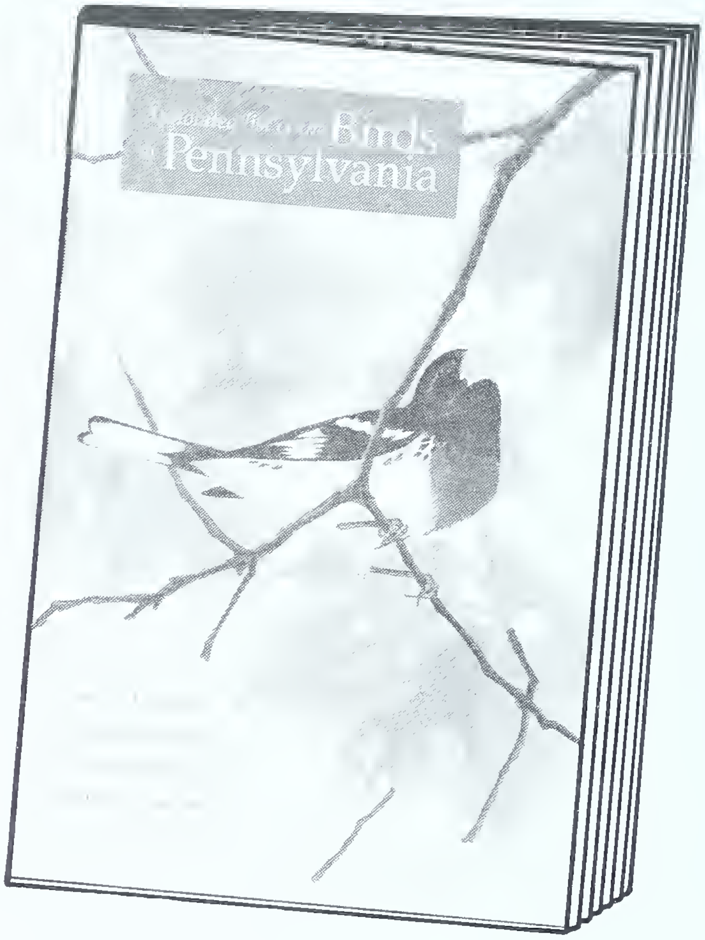
Thank you for your continued financial support.



WRCF PROJECT UPDATE

"Annotated List of the Birds of Pennsylvania"

This project recommendation was funded by the Wild Resource Conservation Board to create an updated Pennsylvania birds checklist. The grant was received by the Pennsylvania Biological Survey Ornithological Technical Committee. *"Annotated List of the Birds of Pennsylvania"* was authored by Steven J. Santner, Daniel W. Brauning, Glenna P. Schwalbe and Paul W. Schwalbe.



This publication is 60 pages, 8.5 x 5.5 inches in size, includes a full-color cover by Michael McNelly, seasonal and regional bar graphs that indicate the relative ease of finding each species, and habitat annotations for all 368 species on the official state list. It covers all 368 species on the official state list, plus 47 species on a supplemental list.

For a $10.00 contribution to the Wild Resource Conservation Fund, we will send you the *"Annotated List of the Birds of Pennsylvania"*. With your donation, you will be placed on "Keystone Wild Notes" mailing list. Be sure to request the publication with your contribution. Please contact Daniel W. Brauning for quantity orders over 10:

Daniel Brauning
RR 2, Box 484
Montgomery, PA 17752

This publication will be available at local Audubon chapters and nature centers across the Commonwealth.

DID YOU KNOW . . . ?

- Some experts estimate that 40 percent of the pollution in America's waterways is from used crankcase oil. About 2.1 million tons of the stuff finds its way into our rivers and streams every year.
- One quart of motor oil can contaminate 250,000 gallons of drinking water.
- One gallon of gasoline can contaminate 750,000 gallons of drinking water.

DO SOMETHING WILD!

AVIAN UTILIZATION OF RECENT FOREST CLEARCUTS IN SOUTHCENTRAL PENNSYLVANIA

by
Amy and Scott Richert
Project Assistants

During spring and summer 1989 and 1990, birds were censused on eight recent clearcuts (less than five years since logging) within Michaux State Forest which is adjacent to farmland and scattered residential development in Adams, Cumberland and Franklin Counties. The purpose of the study was to determine what factors affect bird communities on recent clearcuts in Southcentral Pennsylvania.

A total of 72 bird species were observed. The five most common nesting species were the rufous-sided towhee, common yellowthroat, gray catbird, field sparrow, and American goldfinch. At least two factors were identified as influencing bird communities on recent clearcuts: 1) habitat resources within clearcuts and 2) surrounding land use. One other factor, size of clearcut, may also influence bird communities on recent clearcuts.

Bird species diversity was influenced most by habitat complexity. Clearcuts with the most complex or diverse habitats also had the highest levels of bird species diversity. Patchy vegetation and relatively high densities of snags (standing dead trees), residual trees (standing live trees), and downed logs attracted a high diversity of breeding and foraging birds. Snags were used as nesting sites by cavity-nesting birds such as the northern flicker, house wren, and eastern bluebird. Both snags and residual trees were used by many breeding songbirds as perching sites during territorial defense.

The most obvious factor influencing bird species composition was clearcut location. Clearcuts which were located near the forest boundary and close to farmland or residential areas (forest edge clearcuts), contained more agricultural and urban-adapted species than clearcuts located within the interior forest. For example, the European starling and house finch occurred only on forest edge clearcuts. Conversely, several woodland species such as the woodthrush, veery, and hooded warbler were observed only on interior forest clearcuts.

Surrounding land use also affected densities of birds. The highest densities of eastern kingbirds, indigo buntings, and field sparrows were found on clearcuts close to open-grassy areas such as agricultural fields or powerline right-of-ways. Highest densities of American robins and brown-headed cowbirds were found on forest edge clearcuts near residential areas. Common grackels were most abundant on forest edge clearcuts near agricultural areas.

Compared to interior forest clearcuts, forest edge clearcuts had lower densities of summer residents (migratory species) such as the black-and-white warbler, rufous-sided towhee, and chipping sparrow. Reasons for the low densities of summer residents on edge clearcuts may include the relatively high densities of urban-adapted birds. For example, European starlings, common grackels, and brown-headed cowbirds may interfere with the nesting habits of summer residents.

Size of clearcut may also influence the diversity and density of bird species. Compared to small clearcuts, large clearcuts contained a greater number of foraging species. Large clearcuts also tended to have greater bird densities.

Prior to this research, most studies concerning the responses of birds to forest clearcutting concentrated on habitat characteristics within clearcuts. The present study showed that in addition to resources within clearcuts, factors external to the clearcut may also affect bird communities. Knowledge concerning the influence of surrounding land use of bird communities is especially important in woodlands like Michaux State Forest where adjacent land areas are under increased development pressure.

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